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ORIGINAL ARTICLES

CHILD PSYCHOLOGY AND ITS RELATION TO ORTHODONTIC PRACTICE*

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THE entire civilized world is taking a greater interest in the study of child life, and this country is leading in this movement. By careful study in the school room and in laboratories equipped for child study, scientific men are developing methods by which it is possible to measure the intelligence of a child and train him in a manner best adapted to his special needs. The parent or teacher who fails to keep in touch with the results of these methods of child study and education will soon be as far behind the times as the farmer who plants his crops according to the phases of the moon, or the community who believes its typhoid epidemic is due to Divine wrath.

Not so many years ago the farmer who found musk-rat houses well protected and his corn husks extra thick, prepared for a "hard winter." If a crop failed he would lay the blame on the planets. But today, instead of planting by the moon, he consults the weather reports. When a crop fails, he knows that the seed was bad, that the soil was deficient in nutrition, his method of cultivation was at fault, or the weather was not favorable. During the past two decades the farmer in most parts of the country proceeds more along scientific lines. He knows that his crops are not at the mercy of unseen beings. Rather they grow by laws acting in a natural way. Instead of paying so much attention to studying the almanac, he has set to work to find out the natural laws governing his farming operations and then he directs his activities according to these laws.

Orthodontists spend their lives dealing largely with children, and it would seem that some time spent in the study of this subject should be for the benefit

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of both patient and operator. It is necessary for us to get on with our patients during varying periods—from just a few months in some cases to several years in others. Where the period of treatment is long and the spirit to cooperate on the part of the patient is not what it should be, we have a condition that is not conducive to the best results. So the purpose of this paper is merely to inject more interest into this subject, which is so much worth while.

Successful men in the business and professional world, also those in public life, know much of the psychology of the crowd. This is splendidly illustrated by statesmen when addressing audiences making use of such terms as "My friends," or "My fellow-countrymen." Strange it is that some very brilliant and able men are lacking in a knowledge of mass psychology. Lincoln and Roosevelt understood it well, and so do Billy Sunday and Harry Lauder.

Billy Sunday has the crowd well in mind when he has his janitor tie a pink ribbon on the back of a kitchen chair and has it placed up back of his altar in one of his made-to-order auditoriums. He knows that thousands of men and women will look up from his great audience and say "Why that is the same kind of a chair we have in our kitchen at home. His methods are interesting."

So it was with Roosevelt on his campaign trips in wearing a big broad hat. He knew that many farmers, cowboys and Indians wore them and he knew also that they would like their great leader all the more because he was wearing a hat similar to their own. Their hats gave them something in common, and where people have even one thing in common, getting acquainted is made easier.

Your audiences are much smaller than those of either Roosevelt or Sunday. In fact many times they consist only of a mother and child. You will not care to use either a kitchen chair or a large hat to interest them, in all probability. But you may have at your command a story, a doll, a watch fob, bunch of keys, a good picture—in fact, something, and it can, in many cases, be a very simple thing which will be just as effectual in the matter of side tracking the one thought that is uppermost in the minds of those children—the possibility of being hurt—and at the same time interest those children in other matters by the use of a little psychology, not unlike that used by such men as Roosevelt or Sunday before their larger audiences. Such men are skilled in the art of "breaking the ice"—placing their audiences at ease. So with us, we should study carefully the art of making strange people feel at home if we look forward to establishing professional relations with them.

When a child hears its parents discuss for the first time the question of orthodontic treatment, the first thought in its mind is: "Does it hurt?" It very frequently happens that they are told by some playmate who is under treatment, or who has been under treatment, that it does sometimes pain. Aside from the question of pain, there is another reason why children dread to start treatment and that is their natural aversion to meeting strangers, particularly is this true up to the age of seven.

"I refuse absolutely to sit in that chair, Mother," was the shrill remark of a nine-year-old son of an auto king recently on being brought to the office for orthodontic treatments. In talking this incident over with the family dentist, I was informed that there was syphilitic taint in the family and that another child

in this same family was similarly afflicted, making both children extremely difficult to care for.

In attempting to place under treatment these strange and unusual types of children, which is better—severity or indulgence? It is impossible to give a definite answer, as we deal with children as individuals. Some well-meaning people maintain that until the child has become a rational being it must be considered and treated as a little animal, because it has no sense of shame, or of the rights of property, or of social duty—that those methods which it most fears must be adopted—that is the whip or stick.

As a rule, special attention and indulgence should be shown to children who suffer from nervous fright, or are predisposed to it. One should be kind to them and not oppose their whims with too much severity. Their explosions of grief and nervous agitation are unfortunate; every violent emotion leaves a morbid tendency behind. Is it wise to oppose them? Is it not better in many cases to postpone matters until they become less sensitive, and until they have had time to think things over and reason them out?

When a timid and nervous child comes to one of our offices for the first time, and finds surroundings to which the child is a complete stranger and meets a strange office assistant, and also a strange man, who, he has perhaps heard, is going to cause him pain, and sees suspended from the ceiling or wall a dental engine, whose outline and music he is quite familiar with, is it any wonder that some children give way and are overcome with fear?

A clever, well-trained, and resourceful office assistant who is really fond of children, can do more in many cases in breaking down the feeling of dread and fear that possesses some of our children than any other means at hand. Sunshine, kindness, good stories, pictures of children at play and enjoying their pastimes furnish splendid mediums of establishing an acquaintance with the younger generation.

It has already been stated that some cases require considerable time, and one of our great overwhelming problems is to get children to like us. If at the beginning a child takes a dislike to you, it is better that the parents plan to change orthodontists. Results are not uniformly satisfactory when the proper regard and respect does not prevail between patient and operator.

Human interest works wonders in getting on with the younger generation. Know what the interests and hobbies of your patients are and ask questions in regard to them. Is there a boy anywhere who is not pleased when asked the score his football team ran up on the losing team? Is there any boy scout who is not pleased when you ask relative to the work of his troop? Likewise little girls are so pleased to have it said that their new dress is pretty, or when asked if they enjoyed a recent party. These things may seem to some of you as time thrown away, but to children they have much significance.

Children look at the world through different eyes than our own, and we would do well to get their viewpoint. While under treatment their interests should be our interests and if, in this way, you can make their lives brighter, coming to your office will become a pleasure, not a hardship. Among the boys the use of such terms as "Old Pal," "Old Man," or "Old Top," are names that please them.

With boys you strike a responsive chord at once if you make them out older than they really are. With girls there is no term that sounds so well as "Dear," or, if quite young, "Pet." It is the quick and proper use of these names in our offices that frequently paves the way to not only successful treatment, but to lasting friendships.

There exists among children two traits that are of genuine concern to us in practice—anger and fear—and of the two, the latter is much the more common. Though for a stranger to ingratiate himself into the confidence and good wishes of an angry child, who has been brought to the office by a mother or nurse, is not always a simple task. It frequently involves the employment of much good judgment and tact, and then one sometimes fails.

Anger is hot displeasure due to a sense of injury or wrong. The right kind of anger, rightly governed and directed, is a powerful instrument for justice and good. The wrong kind may not only work disastrous injury to the object at which it is aimed, but usually exhausts the mind and body and weakens the nervous system of the child who gets angry.

With children you must keep open the door to the inner life, and understand its emotions. If you want to cure it of bad temper, or prevent it from having bad temper, it is well to understand the cause, the impression produced on the child's mind by the cause, and the line of reasoning by which it proceeds from the cause to the outburst of anger. Then, when you have found the cause, and understand the nature of the anger, educate the child's will to overcome its tendency, and, most important of all, provide some other outlet for utilizing the emotional force in a useful direction.

Advise parents to encourage games that run to physical contest for the simple reason that exercising his physical muscles against an adversary develops the boy mentally, and gives the poise, the sense of justice and fair play, along with which anger of the wrong kind can not exist. The boy whose sense of personal dignity and worth is neither exaggerated nor too low will have the larger sympathy, the more pity, the better control of temper.

While anger among children gives us some concern in certain individual cases, it is fear on their part that is found to be the greatest obstacle.

The fears of childhood are many, and the first visit to a dentist or orthodontist is unfortunately frequently paid in apprehension or fear that the unusual might happen. And when one thinks of this subject in its broader aspects, it becomes a matter of very great importance, for if the first visits are comfortable and pleasant, it means a favorable impression has been made on the child's mind. If it happens that the child gets the opinion that it is not receiving good treatment, it may mean that the child will go through life with a neglected mouth, or with a bad malocclusion of the teeth, with its face devoid of harmony and symmetry which proper treatment would accomplish.

Mosso, the Italian author in his book entitled "Fear," states—"Every ugly thing told to a child, every shock, every fright given him will remain like minute splinters in the flesh, to torture him all his life long. These bad mistakes in education have not yet disappeared, for children are still frightened with the bogey man, with stories of imaginary monsters, witches, and a hundred other terrors which make the tears come to their eyes and spoil their disposition,

making their lives burdensome, which will make them timid, and shrinking for the rest of their lives. Anxiety, fear, and horror which come to many children through bad stories are miserable possessions which twine themselves into the memory, like so much deadly ivy choking the light of reason.

"The imagination in children is far more vivid and excitable than in adults. When a child is naturally timid, it is better not to leave it in the dark, but to have at least a little light in the room, so that, on waking, it may at once recognize the place, and its fancies may not seem real. The child's eye is much more apt than ours to trace pursuing spectres in the outlines of accustomed objects. The stories told them in the evening, any exciting emotions towards bedtime are quite sure to be reproduced in their dreams.

"The dreams of children are more real, vivid and fearful than is the case with adults, because their brain is so much more impressionable, as is shown by the fact that things seen in childhood are indelibly impressed on the memory, and because their weakness renders them more timid, exaggerates every danger and makes every enemy appear very formidable."

And in conclusion I wish to quote from Dr. Josiah Morse where he states:

"True courage is developed in the young, not by artificially insulating them against all pains and fears, but by teaching them to meet these bravely and wrestle with them until they are overcome. With fear, as with love, hate, anger, pity, etc., it is better for one's soul and character to have had the emotion in due measure and in due season than by artificial training to be kept in ignorance of some of them merely because they are painful. The soul of the overprotected child, like its body, is puny and delicate, and deficient in those fundamental qualities which make for true manhood and womanhood, just as the hothouse plant is inferior in taste, smell, and other qualities to those grown in the open fields."

DISCUSSION

Dr. Elizabeth E. Richardson, San Francisco, Cal.—Mr. President, Members and Friends of the Dewey Alumni Society: I wish to compliment Dr. Burke on the excellence of his paper as it contains some very interesting and important facts.

We know that much time and energy is being spent by men and women prominent in professions in the successful development of child study and education. Our schools on the coast have established classes for backward children. These classes are placed in charge of women teachers who have fitted themselves for this special work, with satisfactory results. Some of these children are being treated for defective speech by specially trained teachers for this branch of work.

Many of these children are referred to the orthodontist for treatment. Each child is a problem in itself, and in the majority of these cases there is a lack of interest on the part of the patient. Here is where psychology is of value, as we must have cooperation.

To successfully control the different types of children is a problem we have to face daily, as there is no set rule. My idea in handling children is as individuals, remembering we are only grown up children. The mind of a child is sensitive and almost uncanny in the power to determine the real from the pretended.

I do not believe that force can be used in overcoming fear. Remember that attraction is the greatest power in the universe. Tenderness and earnestness will do much to win any child's confidence. I have found that the least attention paid to shy and timid children is the best, as they are easily embarrassed. It not only takes patience and tact with these little ones, but due consideration of their timid nervous tendencies, and the most sincere

desires, to enter and take any one of us through the portals of a child's heart, for they are well guarded, not by doubt, but by discernment. The child, unlike the adult, sees with imagination, and feels what he does not see.

It is necessary with some children to be firm to gain their respect and confidence, but we must not defeat our purpose by doing the wrong thing at the wrong time. If the child is timid and nervous and becomes hysterical, I do not attempt anything other than to accustom him to the surroundings of the office for the first visit. A music box will prove of great value in quieting the fears of these timid children. They will invariably ask the nurse to play it for them.

There is another side to be considered, as some children will take advantage of the least familiarity.

I agree with the essayist that we should feel it a pleasure to make the child's life brighter when it comes to us for treatment, as to be successful practitioners in orthodontics, we must be humanitarians.

THE PRESIDENT'S ADDRESS BEFORE THE PACIFIC COAST SOCIETY OF ORTHODONTISTS*

By John Rush McCoy, D.D.S., Los Angeles, Cal.

ONCE more we as an organization have come together to discuss those problems which confront our special field of endeavor. As your presiding officer I am deeply gratified with the excellent work of the program committee whose efforts have provided material which should greatly benefit us as individuals and reflect credit upon us as an organization.

We may well recount with pride the volume of valuable program which has been presented before this Society during the last seven years, and when you consider the fact that each annual meeting evidences a creditable representation of our membership, it shows a healthy enthusiasm of our members, especially when you consider that our small body of men are scattered out over a narrow strip of territory two thousand miles long.

I think that the principal reason for this enthusiasm is the fact that we started out right at the first meeting by adopting exceedingly high standards, our by-laws requiring each member to contribute something to the program of each annual meeting in order to maintain his membership. Let us all see that this standard is continued.

Many orthodontic problems have presented themselves to the profession since the organization of this Society, and I feel proud of the fact that our membership has kept abreast of the times; and may it always be said of our Society that we have made it the instrument by which the membership will continue to progress in orthodontic science.

I am sure that you have all been looking forward to this particular annual meeting since the Society at this time has adopted the policy of bringing men from other sections of the country who have shown themselves to excel in some particular phase of our science.

We are indeed fortunate in having Dr. Mershon, of Philadelphia, as our guest this year to give us his valuable suggestions in lingual arch technic. Dr. Mershon has made an enviable reputation for himself, and I know that we shall leave this meeting greatly enriched with ideas which he will impart to us. Allow me at this time to quote Dr. Mershon's opinion of our responsibility and opportunity as orthodontists. He says, "My conception of orthodontia is that we are not only trying to restore teeth to what we have termed normal occlusion, but to restore the tissues and organs which constitute the oral cavity to normal function. From the time you start to treat a case of malocclusion with the lingual arch until it is finished it might be considered a continuous retainer, as it interferes so little with normal functions and is constantly assisting in the

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development of these oral tissues in the direction of normal growth where nature has failed."

It has been said by another authority that "any ordinary orthodontist can move teeth, but it takes years of study and experience and observation to hold the teeth in their new positions." This, I believe, is the real big problem for us today. To my mind, the most important and probably the most neglected means after efficient retaining appliances are placed is the establishment of, first, normal muscular influences, second, normal bone metabolism.

Dr. Alfred P. Rogers has contributed more than anyone else toward our knowledge of the physiology of muscles of the face and jaws. I consider Dr. Rogers' work on muscle training in its relation to orthodontia to be one of the great strides which orthodontia has made in the past few years, and I feel that any member of our profession who fails to use Dr. Rogers' suggestions is indeed missing a great opportunity to assist the tissues of the face and oral cavity to normal function.

I shall quote Dr. Rogers at length, as I feel extracts from his valuable treatise to be the final word on this most important subject. He says, "I have found, as you all have, that the muscular tissues of the face where they have once acquired the habit of bad behavior do not readily assume the normal. That some form of training was necessary became very apparent, and with this conviction solidly established, I proceeded to formulate and practice definite forms of muscle culture for the facial muscles. I soon found that in order to be successful in this branch of the work, it was necessary to make careful study of the various adjustments of the muscle groups, and that in order to obtain proper muscular control, we must also seek to obtain satisfactory mental control. Also, that it is necessary at the outset, in order to obtain results, that the parent and the child be convinced of the importance of the work and be given their part in the responsibility for future success or failure.

"In some forms of malocclusion, the unfavorable position in which muscles appeared to be placed to perform that particular work which they were supposed to do was apparent, and I became strongly convinced that these intricate muscles must be carefully trained in order to assume the exquisite positions in which their normal actions would place them. I soon discovered that ordinary muscle culture would not bring the desired results as quickly or as permanently as a thorough practice of conscious control over the facial muscles. The object of my efforts has been to teach those patients in need of this form of treatment to consciously use the muscles and forces of occlusion, after first becoming instructed as to their proper positions.

"This muscular work, of course, must go along hand in hand with the mechanical treatment of the case, and no undue muscular pressure must be allowed until the patient has learned to place the arches in their proper relation, which function is taught them after the major interferences have been removed. The object of the work is to so strengthen the muscles of mastication that they will assume their normal function, not only resulting in a maintenance of occlusion, but in building a stronger masticatory apparatus as well—that the so-called muscles of expression shall be so trained as to be under conscious control, and not allowed to 'run riot in response to almost every emotion.'

"It can be readily understood, then, that we are justified in concluding that our work will be even more enhanced if we are able to obtain the harmonious development of the entire organism.

"The principles of procedure are therefore: First, the mechanical reestablishment of arch form and cusp relation by the simplest mechanical means, thus removing any interference which tends to discourage the normal functions of the muscles. Second, the principle of muscular balance and mechanical advantage in the complete organism, including special guidance and control of those muscles concerned in the particular weakness upon which our attention is to be directed, urging them on to their normal development and strength until the harmoniously developed face completes the restoration of the organism to its normal inheritance.

"The orthodontist among his recollections of failures has a keen sense of the presence among that ghostly group of various forms of Class II which have failed of retention after his prolonged and conscientious efforts with intermaxillary elastics and various forms of retention. Failures of this nature would be much less common with us if the orthodontist understood and applied the principle of conscious control of the muscles of mastication, training them and causing them to do the greatest activity in their normal position.

"In contemplating work of this nature, the orthodontist must ever bear in mind the fact that muscles tend to stay in the position in which they do their most and hardest work, and that this work must be done with the arches in their true relation one to the other, for it is then that the masticatory apparatus has assumed the position of mechanical advantage, and it will be surprising how quickly the various muscle groups will respond to the work thus placed upon them, because they are in the position which nature has intended that they should occupy.

"It will be logical for us at this point to direct our attention to that most important group of muscles—the external and internal pterygoids. The advantageous positions which Nature has given these groups will be readily seen. They are the muscles which control the movements of the mandible. If the mandible is forced into distal position, these muscles soon form the habit of keeping it there. It may be well for me at this point to emphasize the importance of the early exercise of these muscles in cases where it is required. It is good practice in cases of Class II to train these muscles through exercise, so that the proper position of the mandible is readily taken when opportunity is given to it. It not only relieves strain upon the teeth, but avoids many other complications. Of course, there are cases in which light intermaxillary elastics will be found of advantage.

"The exercise of these muscles consists in throwing the mandible forward as far as possible. The patient requiring this form of exercise is instructed to throw the mandible forward as far as possible, or until the lower anterior teeth are placed in labial occlusion to the uppers, and held there for ten or more seconds and then slightly relaxed. The effort is then repeated as many times as the nature of the case requires. In some cases this will at first be found impossible, but after practice the work becomes easy. Very little of this exercise is sufficient in the case of some, while in others it is almost impossible to overdo it.

"After the ability to place the teeth in proper relation has been acquired, another exercise is added—that of the temporal and masseter muscles. This exercise consists of holding the teeth firmly in occlusion and alternately contracting and relaxing these groups of muscles. In many cases it will be found that the ability to contract these muscles is very slight indeed, but after a few months' practice, the operator is gratified to find greatly increased tone and improved control, as is shown by the ability to contract and relax. All efforts must be made with great concentration, and must be complete in their relaxation and their contraction. The ability to completely relax these muscles between each impulse is important to secure as muscles exercised in this manner, for physiologic reasons, grow stronger much more quickly.

"The group of muscles contiguous to the lips consist of the levator labii, depressor labii, zygomaticus, orbicularis oris and platysma myoides. The names of some of these muscles indicate their function, and are perfectly well known to you. If they lack tone, or are not under control of the nervous system, they are the muscles which are most apt to place perplexing problems before the orthodontist. Most of these muscles are in some way attached to the orbicularis oris, and when we have a general lack of tone in all these muscles, there is sure to be a lack of balance between them and the inner forces, such as the tongue. There are numerous exercises which can be used for stimulation of this group, but it will be well for us to direct our attention to the orbicularis oris.

"Many of you, no doubt, have had difficulty in retaining the upper incisors in correct position. It is necessary, frequently, to apply retaining apparatus to effect this purpose, but if, in the meantime, this muscle has not been strengthened, in case it originally lacked tone, upon the removal of the retaining apparatus the incisors again become protruded. There are several cases in one's practice where better results can be obtained in cases of this character without any retaining apparatus at all. One valuable exercise for strengthening the orbicularis oris muscle consists in pitting the strength of the thumb and first finger, or two first fingers, against the contractile forces of this muscle. Care must be taken in the performance of this exercise not to stretch, but rather to contract the muscle around slightly separated fingers; thus ensues a contest of strength between the orbicularis oris and the muscles of the fingers.

"It is frequently found necessary to prescribe a tonic exercise, which might be termed the exercise for general facial development. This exercise influences not only the orbicularis oris, but also the buccinator and all the small ribbon muscles which enter into a combination with the orbicularis oris. It consists in the use of warm water at a temperature which is bearable to the mucous membrane of the mouth, and in which has been dissolved a small portion of bicarbonate of soda. The patient is directed to take a sip of this solution, closing the teeth firmly in position, and with great energy forcing the liquid from the lingual cavity into the buccal. The exercise is usually done five times morning and night. The patient is directed to continue each exercise until the muscles are slightly fatigued.

"The platysma myoides is one which is of great importance when considering the correction of faults in the facial muscular development. This muscle has no bony attachments but is inserted in the fascia and skin of the pectoral

and deltoid muscles of the chest and upper shoulder at one end, and at its facial extremity is inserted by many fibers into the orbicularis oris and some of the other muscles upon or near their entrance into the same. It will then be seen that, if this muscle is contracted in its length by the bad posture of the patient, it has a tendency to stretch the weakened muscles of the face in directions which bring gentle but harmful pressure upon the fragile bony structure of the child's face. The exercise for this muscle consists in having the patient stand with feet together, hips slightly thrown back, directing the child to look straight to the zenith, at the same time drawing in the abdominal wall and turning the palms of the hands outward, making a slow and positive stretching motion with the tips of the fingers and the point of the chin. The child is then directed to relax somewhat, bringing the head and arms to erect position, then repeating the impulse."

I have put all these exercises to the test in my own practice with considerable success, so can highly recommend them to you. The pterygoid exercise in Class II cases, the masseter in open-bite cases and the orbicularis oris exercise in cases of short upper lip, the latter being extremely valuable in cases of habitual mouth breathers where every effort has been made to have the patient keep lips closed at night, this exercise being by far the best means of restoring normal function.

The second often neglected means of permanent retention is normal cell metabolism, particularly of the bones in which the dental apparatus is encased. I feel this is a subject which has been given entirely too little consideration.

Dr. Wenker who has given this subject exhaustive study tells us, "It has been evident for many years that the nutrition of the child in the first months of life is of great importance in relation to future growth. It appears that a given handicap to normal metabolism is more harmful in proportion as it occurs earlier in its life.

"Dietary considerations are therefore the next in order, and although the physician in charge usually attends to this requirement, still the orthodontist should be familiar with this subject that he may intelligently discuss it with the parents or physician in its relation to jaw development.

"Williams, an authority on obstetrics, has submitted evidence of the infrequency of normal nursing of infants. He makes the statement that less than 25 per cent of the mothers of New York State are able to nurse their children and that the number is decreasing. Hellman contends that arrested development of the jaws is more prevalent among artificially fed infants than among the breast fed. He has estimated that 81 per cent of arrested jaw development may be found in the artificial class."

Dr. Wenker reports that of 643 children he has found 508 cases of maldevelopment of the jaws in the artificial class, or a trifle over 79 per cent, and that there is a large percentage of arrested development among this class is very evident to the observing orthodontist, and this may be accounted for in the different proportion of the ingredients and digestible quality of cow's milk and other substitutes as compared with human milk.

Dr. Talbot, in discussing the diet and its relation to the teeth and the role of calcium phosphate in metabolism, says, "It must be considered from the point

of view of the metabolism as a whole, and of the metabolism in diseases of the bony structure, such as rickets, the commonest disease of the bones, and an affection of infancy. Rickets is the disease most often associated with delayed dentition; it is characterized by a deficiency of calcium in the skeleton. There seems to be enough evidence to conclude that certain abnormalities of digestion may so affect the absorption of calcium that rickets develops even when the food contains a sufficiency of calcium. According to a table prepared by Sherman showing the calcium contents of the common articles of food, beef, polished rice, and bananas are extraordinarily low in calcium. The more highly refined wheat is, the less calcium does it contain. Milk, oatmeal, and beans stand out as containing large amounts of calcium, and obviously should be given in large amounts when it is desirable to feed more calcium to the body. Phosphorus is necessary as well as calcium to form skeleton and teeth; it is deposited in both structures in combination with calcium. An abundance of phosphorus in suitable forms is most readily and economically secured by the free use of milk, eggs, vegetables, and such cereal products and breadstuffs as contain at least a part of the outer layers as well as the inner portion of the grains. Plain cheese, containing all the calcium of milk, should be used much more often than is the custom in this country."

Dr. Wenker says, "In my estimation rachitis is one of the most important dietary disturbances in the entire list. I believe it is a much more active causative factor than it is generally conceded to be. Heretofore, we have only recognized it in its most pronounced form. As a matter of fact, there are a great variety of minor manifestations, and particularly that of arrested jaw development, which have in a large measure been overlooked. Lischer has called our attention to maldevelopment of the mandible resulting from rickets. Holt and Fischer have also mentioned it as a factor, but in a rather general way. In my studies and clinical observation it appears that in every case of rachitis with all of the gross classical symptoms there is usually a marked jaw deformity. There is also a large percentage of cases with minor general bone involvement which manifest comparatively mild forms of jaw deformities. Dewey has called our attention to the early shedding of deciduous teeth and tardy eruption of the permanent teeth in rachitic children. The absence of mechanical stimulus to the jaws supplied by erupted deciduous teeth from the shedding until the eruption of the permanent teeth must have a detrimental effect on their growth. Noyes has discussed this mechanical stimulus imparted to the growing jaws by the presence of the teeth. There is also manifested in rickets a tardy eruption of the deciduous teeth which frequently causes much difficulty, such as inflammation, pain, and suppuration. The artificially fed class, however, does not supply all of the cases of rickets."

There are no drugs known that will affect the growth of teeth. Rickets is said to be affected favorably by teaspoonful doses of phosphorus and cod-liver oil in the proportion of 1:3000.

There is little doubt but that we have all had our troubles in maintaining our results in these cases where there is a tendency toward rachitis, and it seems to me that by starting early to prescribe a diet, even a year or so before our me-

chanical treatment is started, we could save ourselves considerable embarrassment which is bound to come when our retaining appliances are removed.

I am particularly glad that we are to have a paper at this meeting along these lines by Dr. Fleischner who is eminently able to give us some valuable points.

In closing, I wish to thank those who have made this meeting possible, and Dr. B. Frank Gray, in particular, who has worked unceasingly as chairman of the program committee.

DISCUSSION

Dr. A. E. Scott, San Francisco, Calif.—I want to thank Dr. McCoy for his excellent paper, and I think that we should all feel very grateful to him for having so vividly called to our attention the many good things that it contains. Very often we are apt to read a thing, give it what we consider a fair and honest trial, and accept or reject it without giving it a proper amount of consideration. I think the mere fact that we are going back to some of the things that were done several years ago proves this contention. Not many years ago the medical world knew very little about the appendix. Then someone discovered that in some instances it was the source of trouble, and not long afterward most every patient was losing her or his appendix. "It is not good to keep something that is so apt to do harm," they argued. But now they have decided that certain conditions warrant the removal of an appendix; some should come out, while others should remain. So it is with orthodontic procedures. Some have real merit, while others have very little or none.

For some time I have been interested in Dr. Roger's muscle training and development. It occurred to me when I was in the army and had to do a certain amount of calisthenic exercise each day, which, as I understand, was for the purpose of bringing about a proper functional activity of the body, that the same thing applied to the muscles of the face would bring about a more normal development of the parts which they control. Some people are able to move the scalp and a few the ears. Whether this is muscular or nervous development I am unable to say.

I think that none of us any longer confine our attentions to simply correcting malocclusions from a mechanical standpoint. We not only attempt to establish normal occlusion, but normalities in breathing, mastication, speaking and finally in appearance. What we wish to do is to establish a condition as nature intended—one which she herself would have produced had her course not have been interfered with by some known or unknown cause. Almost every day I am convinced that there are cases that we would be much better off to leave alone unless we can discover and remove the cause of the disturbance. It seems to me that our position is similar to that of the novice who goes in search for gold without knowing its color, specific gravity and other characteristics. Sometimes we would not recognize what we are searching for if we should find it.

I shall not attempt to add anything to the work of such an eminent authority as Dr. Rogers. From all indications I think that his work has a real practical value in every-day practice; that it is the result of considerable thought and study; and that in presenting it he has done much to make a greater percentage of our cases successful. I think that we can not doubt its value any more than we can doubt the value of training on the athletic field or in the gymnasium. In the consideration of any face we must keep in mind that the maximum beauty for that particular face is only obtainable when the teeth are in their proper position not only at rest but in function as well. From what little I have been able to learn and observe, we seldom, if ever, get what we term a "mouth full of teeth" when cases are treated before the age of twelve years. A case should be considered successful just in proportion to its degree of retention and its retention is just in proportion to its proper function. No doubt more so-called pyorrhea results from improper function than we are prone to admit.

Heretofore little or no attention has been paid to the teeth from a medical stand-

point. Bad teeth may be the cause of a deformity. Rickets is a disease caused by malnutrition with lack of lime salts and characterized by bow legs, flat feet, etc. This is not only due to quantity of food, but quality as well. With poor teeth the child can not masticate food, and therefore can not obtain sufficient nutrition. Whether rickets is the cause of poorly formed and malposed teeth, or poorly formed and malposed teeth are the cause of rickets, I am unable to state. However, I believe that the juice of half an orange given a child once a day until the age of five or six is reached is almost a specific for this disease.

Artificial feeding of infants is certainly most unnatural, and being such, we should expect some astounding results not only from the food itself but from the mode of taking. The breast is so constructed that the pressure is more or less equal from within and without. With the ordinary artificial method of feeding pressure is produced in such a way as to cause an abnormal shaping of the bones, thus carrying the teeth with them into malpositions, if not malformations. I trust that Dr. Fleischner will give us some interesting information on this subject.

Dr. H. L. Morehouse, Spokane, Wash.—Dr. McCoy's address has been most interesting. He has spoken of the work of Dr. Rogers in his efforts to secure better muscular tone and to assist in the correction of malocclusion, and while I have not given it a deep study I have tested it somewhat in a few cases during the past year. I would believe in order to get proper results from this muscular training, we should start at an early age. I think in many cases of Class II we find a condition of "backward development" in the mandibular articulation caused from the muscular pull on the jaw and bringing about the locking of the teeth in distal occlusion. In two specific cases I have started at an early age and have secured beneficial results in Class II cases of that kind. In fact in a short time these patients were unable to get the distal occlusion at all. I do not know how far this work can be carried, but it is my opinion that if it were studied carefully much could be done toward the elimination of a lot of tooth movement and unnecessary bone development in the direction we usually carry our cases.

In regard to another character of case, such as the undeveloped symphysis, I might make some comments, but will not do so as I shall bring that out in a paper I shall read later.

In writing to Dr. Rogers I learned there were certain conditions impossible to overcome even by these methods, although carefully and skillfully applied.

Dr. John V. Mershon, Philadelphia, Pa.—I wish to express my appreciation of the presentation of the corelated symptomatic conditions Dr. McCoy has so splendidly set forth relating to many of our problems. He has touched on a matter vital to the problems concerning the orthodontist of today, and which has to be combined with appliances, with muscular training and with everything else we do, that is, nutrition; I think our nutritional disturbances are the fundamentals of all our troubles.

Dr. Wm. Cavanagh.—I feel our president has given us ample subject-matter for an all morning discussion, especially as to muscular development, and also the condition recognized as of rachitic origin. I believe we have felt in those cases where we note the permanent teeth are pitted on eruption, with faulty enamel development, etc., we also have a very faulty development of the osseous tissues, and we find such teeth resist movement to an extreme degree. I have a patient at the present time of ten or twelve years of age, whose teeth are as rigidly fixed in the bone as those of other individuals of thirty or thirty-five years of age. We do attempt treatment of some of the latter. In my experience I find when the time comes to remove the regulating appliances and put on retainers, we must state to those patients and the parents, that retention will cover an indefinite period because of the condition that is present.

I have sent a number of such cases to physicians and their prescription is "fatty foods"—or an emulsion of cod-liver oil, and every one of those patients whose teeth resist movement in that manner, will avoid a fatty diet. I have questioned dozens of

parents and learned the children do not like fats of any kind, and so I think there is a relation as between the lack of appetite for fats and the resistance of those teeth to movement.

As to muscular development for the correction of unbalanced muscles, I think it would be of great assistance in Class II, Division 1 cases. I believe such cases are all preventable if we could prescribe the use of some musical wind instrument at an early age that would develop the labial muscles, and I do not think under such circumstances we would ever have a case of protruding upper centrals and laterals with those children who exhibited that tendency to begin with, if they were taught and compelled to practice on the clarinet, slide trombone, cornet, etc. I have worked for patients who have practiced on such instruments from childhood, and the lips were so rigid it was difficult to keep them out of the way of the work. I noticed it in general practice especially, and in one case of correction of malocclusion where the central incisors were tipped lingually, it was due to over-development of the labial muscle and I doubt if we can retain the teeth in normal position on account of the overdevelopment of the upper lip. The same thing occurs in harelip that has been operated on. I undertook the correction of one or two of those cases. Never again! The contractile tissue will force the central incisors lingually in spite of your efforts.

HISTORY OF ORTHODONTIA

(*Continued from page* 167)

By Bernhard Wolf Weinberger, D.D.S., New York City

DR. LEVITT E. CUSTER in the *Ohio Journal of Dental Science,* 1888, under *Intermittent Pressure, Its Relation to Orthodontia,* states:

"To move teeth in the alveoli, we are dependent upon the same fundamental principle of the animal economy as that by which all change of shape in osseous structures is accomplished, namely: resorption and deposition. The theory was once held that there is an actual digestion and excavation in one portion, and a new deposition taking place in another. During the preparation of the lower jaw for the permanent molars, the ramus is carried back, not by an interstitial development, but by a resorption anteriorly, and a deposition posteriorly. When lime salts have once been deposited as the basis substance of bone, they, by virtue of their intense hardness and heterogeneous nature, retain that form until reduced by retrograde metamorphosis to the embryonic condition.

"Resorption, as a physiological process, takes place under the agency of a class of cells which may be understood to have a retrograde function. They break down tissue already built, and under accidental conditions reduce foreign substances of animal origin to a condition fit for assimilation by osmosis. Such cells, according to where found, have been termed leucocytes, giant cells, osteoclasts or odontoclasts.

"The above cells, even though of retrograde function, like all others are brought into action by adequate stimuli. Every different cell requires a special excitation; for the cells of the salivary glands to act, there is reflex nervous irritation originating in the gustatory cells; for muscle cells, motor impulse; for giant cells, a thrombus, an infarct or foreign body; for odontoclasts or osteoclasts, the effort of nature to change the size or shape of a preexisting osseous structure. Osteoclasts are also stimulated by pressure, and upon the latter do we depend for change of shape in the alveolar process for correcting irregularities. When Nature has once fashioned the alveolus and the arrangement of the teeth to satisfy our own typal demands, we can ask no more of her as a stimulant, but must resort to the other method; namely, pressure. All the forms of pressure for regulating resolve themselves into either of two classes of forces, intermittent, or constant. Under the former may be classed those forces which move to a definite distance and there remain stationary, such as the screw in all its forms; under the latter, constant force, all those which bear with an elastic or continued pressure, such as the spring or rubber bands. Intermittent pressure acts intermittently as such because the space gained by absorption is not followed up immediately by new pressure only as it is applied by the operator.

"The method by which giant cells, leucocytes, osteoclasts or odontoclasts,

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cells of retrograde function, reduce substances has been designated by *Dr. Black* as resorptive digestion. We understand these cells to have the property of throwing out a digestive fluid which acts as a soluble ferment analogous to that of ptyaline, pepsin, or trypsin. In each case this fluid varies according to the nature of the object to be digested. *Krause* maintains that in absorption of osseous tissue this fluid is lactic acid. In order to act, these cells arrange themselves as to be in direct apposition with the part to be digested, they become in actual contact. Implanted teeth, the roots of which are undergoing absorption, contain pits which are lined with odontoclasts. In the formation of sequestra of bone, osteoclasts are found at the line of union of the dead with the living; ligatures are surrounded and crowded with leucocytes. In sponge-graft, granulations are filling up the pores while giant cells are preparing the walls for osmosis, and blood clots become organized by the presence of connective tissue cells." *Dr. Black* says, "The osteoclasts are not attached to the surface of the bone or tooth by any mechanical means whatever; they simply lie against the surface and are detached with the least movement. They act only, however, when lying in contact with the surface. Any intervening substance whatever will prevent their action.

"From the foregoing it is evident that the action of osteoclasts may be lessened or entirely suspended by either of two conditions; dilution of the digestive fluid, or separation of the cells from the point of absorption. When resorption is produced artificially, and it is agreed that pressure is necessary to stimulate osteoclasts, as the result of pressure there are associated conditions affecting the action of these cells, which vary according to the method used. By one method of pressure the digestive fluid may be weakened, or by another the cells may be separated from the seat of absorption by intervening bodies. Any form of pressure in orthodontia, if continued long enough and hard enough, will produce hyperemia followed by inflammation and possibly suppuration or abscess. When hyperemia occurs we have a serous and a corpuscular exudate which infiltrate the surrounding tissue. Serum being a liquid which in small quantities is taken up by the lymphatics, but when increased, producing edema, readily comes in contact with the digestive fluid of the osteoclasts which is diluted and resorption retarded. On the other hand, the blood corpuscles of hyperemia not being liquid insinuate themselves between the cells and the point of absorption and become a mechanical obstruction to their action. In inflammation we have as well as the serous and corpuscular, an additional one, fibrinous, which at first acts mechanically and after liquefaction becomes a menstrum for weakening the digestive fluid. The result of mechanical obstruction to the action of these cells is no better shown than by the resorption of the roots of temporary teeth where the process is stopped by the occurrence of abscess. In this instance the resorptive cells become disseminated among the pus corpuscles, and not being able to act unless in contact, the process ceases. Resorption is more marked when the digestive fluid is undiluted, but when it is disseminated in the serous exudate of hyperemia, fibrinous exudate of inflammation or the pus corpuscles of abscess, it becomes retarded. Herein lies the problem of the efficiency of the different methods—to stimulate retrograde cellular activity without producing excessive hyperemia or inflammation.

"Cognizant of the fact that resorption produced by artificial means or by external agents is not to be compared with nature's physiological process in that we have to deal with two opposites—to stimulate osteoclasts by pressure and at the same time prevent excessive hyperemia and inflammation, the result of pressure—we may yet by a peculiar method of pressure produce a process approaching very closely nature's own. Such a method of pressure, besides being sufficient to stimulate osteoclasts to action, will allow, first, regain of tone to the blood vessels and lymphatics in the region of pressure; and second, it will allow free exchange of pabulum and rapid entrance into the lymphatics of the dissolved bone tissue. Of the first condition, I say there will be regain of tone in the vessels, because pressure of any kind tends to paralyze the vasomotor nerves in that region and hyperemia will result. Let the pressure be continued and the exudates of hyperemia will follow, which will retard the action of the osteoclasts in the two ways that have been shown. On the other hand, let there be an intermittent pressure, and the room gained by the osteoclasts while under pressure will allow regain of tone to the vessels during that period which some have denominated 'rest.'

"The osteoclast, like all other cells, has three properties, ingesta, assimilation, and excreta; it also ceases to act when this excreta is not removed. Since the lymphatics under pressure can not so readily absorb the waste products of the body, and since under continued pressure we have continued stimulation and continued action of osteoclasts, as a result, we have a continued formation of excreta in the most unfavorable conditions for its removal; but let this pressure be such that it will expand to a definite distance and there remain stationary, then the space gained by active work of the osteoclasts before their action is stopped by the excreta or dissolved lime salts will allow their escape by the lymphatics which have regained tone. Under continued pressure there is not a free exchange of fluids; mechanical resistance keeps back pabulum, and the osteoclasts become surrounded by their own debris.

"Besides the peculiar fitness and adaption of intermittent pressure in the above two fundamental conditions for a physiologic performance of resorption, there are other minor qualities which render it still more desirable as a system of pressure to be used in orthodontia. More force may be applied by this method than by the other, and the teeth acting as a lever will under this increased force produce enough pressure, not on the edge alone, but in the body of the alveolus to stimulate osteoclasts in that portion. Were elastic pressure applied even to inflammation, this would not be strong enough to produce resorption at any other point than directly opposite the tooth. I think there is more in this than we are willing to admit. To produce any other resorption than opposite the tooth by elastic force the peridental membrane would run high in inflammation. This is an easy thing to accomplish with intermittent force since we are able to apply many times the amount of pressure with less danger of inflammation.

"It is a *positive* method, and distance gained by its use is definite; it may be measured with mathematical precision; also holds what has been gained.

"It needs no renewing; once in place it may be used, as a general thing, until the end is accomplished. As a result the new depositions of osseous materials are not interfered with as they would be when the tooth is drawn back by

the fibers of the peridental membrane during the change of apparatus; the death of pulps has been attributed to breaking or changing of appliances.

"Under intermittent pressure we have a work almost painlessly performed, because more nearly a physiologic process. According as are all either constructive or retrograde processes physiologically performed are they painless, and as they approach the pathologic do they become painful. We have a work more progressive, because of continued action under natural laws—not an action that is half inflammatory; and a work that is more effective, because produced by causes which work more in harmony with nature, which allows regain of tone, free exchange of pabulum, and more favorable conditions for contact of resorber with resorbed, and an undiluted action of the digestive fluid."

A. Sternfeld—1891, exactly forty-four years after Carabelli's, a book on the same subject was published by *Sternfeld, "Bissarten und bissanomaliin"* (forms of bite and anomalies of bite); and in 1891 the same author published in Handbuch der Zahnheilkunde an article on *Anomalien der Zähne.*

In the last-named article *Sternfeld* introduces a nomenclature which has for its basis terms employed in anthropology. He recognizes two classes of occlusion—a physiologic or ethnologic, and a pathologic.

"The first class, the ethnologic, comprises the following named species: (1) Orthognathia dentalis: Normal bite. (2) Prognathia ethnologic Prognathism. The same condition exists here as in (1), with the difference that here the maxillary teeth have a forward direction. (3) Orthogeneia: Edge-to-edge bite. (4) Progeneia ethnologica: Protrusion of the mandible.

Under the Pathologic forms of occlusion *Sternfeld* ranges the following: (1) Prognathia pathologic: Protrusion of the maxilla. (2) Orthogeneia pathologica: Pathologic edge-to-edge bite—which he says is very rare. (3) Orthognathia pathologica: Pathologic normal bite—which is also seldom met with. (4) Progeneia pathologia: Pathologic protrusion of the lower jaw; not rare. (5) Opisthogeneia: Retrusion of the mandible. (6) Opisthognathia: Retrusion of the maxilla.

By combining two distinct forms of the anomalies, expression can be given to certain sub-forms, e.g., a retrusion of the maxilla (opisthognathia) with a protrusion of the lower (progenia), i.e., progeneic opisthognathism.

In general, *Sternfeld* applies the term "gnathia" for the upper and "geneia" for the lower jaw, and uses the prefixes "orth—," "opistho," and "pro(s)—" to indicate the position of the teeth, whether straight, backward, or forward.

Sternfeld cites as an example of ethnologic progeneia the ancient Frisians, and gives this on the authority of *Virchow,* who in his *"Beitrage zur physischen Anthropoligie der Deutchen mit Besonderer Berucksichtigung der Friezen"* (Contribution to the physical anthropology of the Germans, with special reference to the Frisians), 1877, claims for the ancient Frisians protrusion of the lower jaw as a racial characteristic, and in support of his conclusions gives a few drawings of ancient skulls. In the text, however, we find some passages which make it extremely doubtful whether the conclusions of Virchow are correct.

Joseph Iszlay—Before the dental section of the *International Medical Congress* held in London in 1881 Iszlay read a paper entitled *"Illustrative Skizzen in Carabelli's Mordex Prorsus und desen Verhaltniss zur sogenannten*

Prognathia ethnologic und Meyer's Crania Progenaea," in which the author proposes a new nomenclature for the forms of malocclusion.

Ten years later, in 1891, *Iszlay* published a short paper on the same subject in the *Oesterreichisch Ungarische Vierteljahresschrift für Zahnheilkunde,* which paper may be considered a revised and condensed edition of that which he read in 1881.

Iszlay suggested a new classification for the various ways of biting and the anomaly of the position of the teeth. He considered the classifications heretofore given as inadequate and not clear and distinguished the following as the chief forms of irregularities, using the upper teeth as a basis.

In the *Fourth International Dental Congress,* 1904, page 326, vol. II we find *Iszlay's* classification.

"(I) The front teeth of the lower jaw strike back of the upper teeth: *Enarmosis.*

"(II) The front teeth of the lower jaw strike in front of the upper: Protrusion of the lower teeth: *Epharmosis.*

"(III) The cutting edges of the lower teeth meet the same edges of the upper teeth: Edge-to-edge bite: *Prosarmosis.*

"(IV) Between the upper and lower teeth there is an open space: Open bite: *Opharmosis.*

"(V) The lower teeth cross the upper teeth: Cross bite: *Dicharmosis.*

"(VI) The odontharmosis is mixed up: Mixed bite: *Tyrpharmosis.*

"*Genus* I. *Enarmosis*: Normal bite. The teeth of the mandible strike back of the lingual surface of the upper teeth, leaving hardly any space between them, the teeth of the mandible being overlapped by those of the maxilla by one or two millimeters.

"*Species* 1. The same relationship as preceding, with the difference that there is a greater distance between the labial surfaces of the lower teeth and lingual surfaces of the upper teeth: *Di-enarmosis* (away from).

"*Species* 2. The same relationship as in species 1, with the difference that the lower teeth are here overlapped to a greater extent by the upper teeth: Deep bite: *Dys-enarmosis* (wrong).

"Both classes appear either separate or combined; in the latter case we have protrusion with a deep bite: *Dys-di-enarmosis.*

"*Genus II. Epharmosis:* Protrusion of lower teeth. Here the relationship between the lower and the upper teeth is reversed. The lower teeth stand in front of the upper and are overlapped by the upper teeth to the extent of one or two millimeters.

"*Species* 1. The same as species 1, genus I, but reversed: Protrusion of the lower teeth, but being greater it is called *Di-epharmosis.*

"*Species* 2. The same as species 2, genus I, but reversed: Deep bite with lower teeth in front—*Dys-epharmosis.* Where both species are combined we have more or less protrusion with a deep bite: *Dys-di-epharmosis.*

"*Genus III. Prosarmosis:* Edge-to-edge bite. It comprises those cases where the cutting edges of the lower teeth meet the cutting edges of the upper. (No species.)

"*Genus IV. Opharmosis:* Open bite. Here are included those cases where

on closing the mouth the molars and premolars or the molars alone meet, leaving an opening between the front teeth. (No species.)

"Genus V. Dicharmosis: Divided, cross bite. Characterized by a combination of the foregoing genuses; one side may be enarmotic, the other epharmotic, etc.

"Genus VI. Tyrpharmosis: Mixed bite. Here the odontharmosis is so mixed up that it can not be grouped under any of the genuses enumerated, either in one or two combinations."

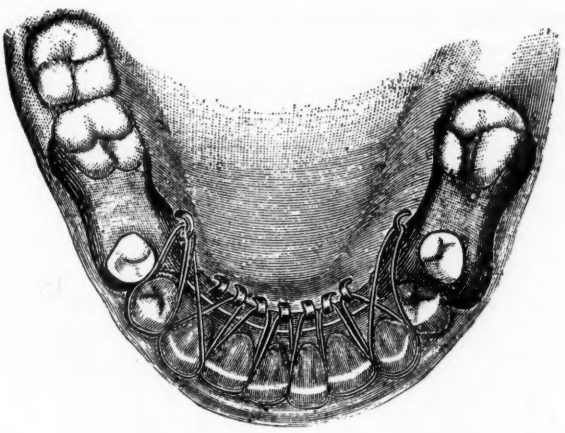

Fig. 1.

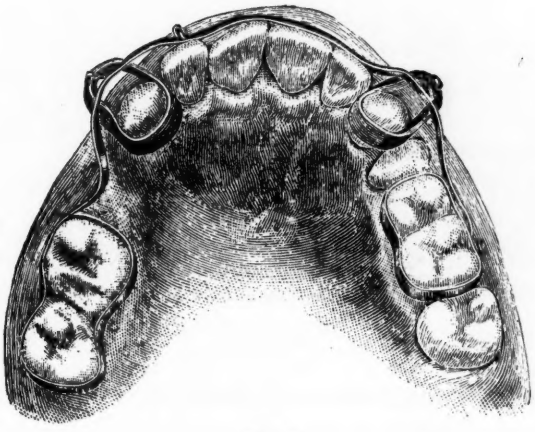

Fig. 2.

E. Henry Neall, Cosmos, 1892, page 975, *Protrusion of the Inferior Maxilla: A Case in Practice:*

"The first and only appliance for the lower jaw (Fig. 1) was placed in position December 15, 1890, and consisted of a frame of platinized gold, having hooks soldered to the inner part and setting well back of the teeth, being held in position by vulcanite attachments surrounding and covering the molar teeth on each side, which also served to open the bite. These were cut away on the occluding surface from time to time, as the changes produced in the articulation rendered necessary. Rubber bands cut from French tubing were then placed around each of the protruding teeth and attached to the hooks on the frame.

Pressure was also brought to bear upon the body of the maxilla by a cap-bandage, worn day and night, and only removed for a short time at intervals. The patient was instructed to press the jaw upward and backward with the hand. Heroic treatment, ably seconded by the patient, was used from the start.

"On the commencement of the fifth week, January 16, 1891, an appliance was made for the upper jaw (Fig. 2) consisting of a platinized gold frame (with two hooks over the cuspids) extending outside the teeth and cemented by oxy-phosphate of zinc to the molar teeth. This was worn just two weeks, and was used to pull forward the cuspids. With this exception, no pressure was used on the upper teeth, as the jaw was normal and did not need to be changed.

"To the question, What was accomplished? I answer, several changes took place. First, the lower teeth were brought inward and close together; second,

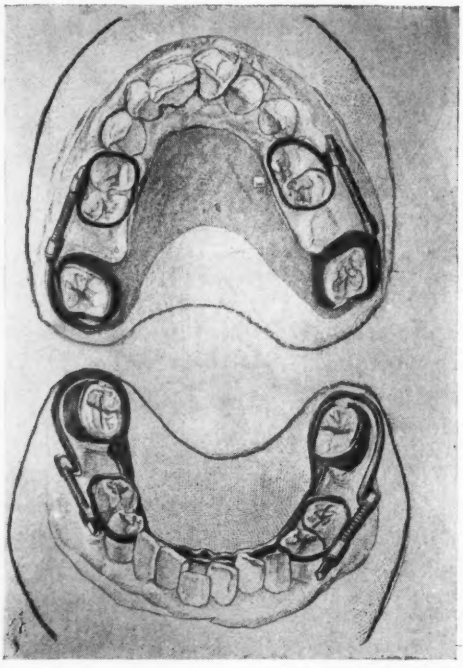

Fig. 3.

a change was undoubtedly made in the articulation of the condyle of the inferior maxilla with the temporal bone; and, third, I believe a shortening of the angle of the jaw took place."

Otto Walkhoff, "Die unregelmässigkeiten in der zahnstellung und ihre behandlung." This book of 180 pages treats of irregularities of the teeth and their correction. *Walkhoff* describes the method of his co-workers then in use and his own methods of handling these complex conditions. He himself contributed little that was new.

C. Sauer 1877 contributed a great deal toward the development of Orthodontia. He stated "that irregularities of the teeth were due, in part, to the influence of the cheeks, the lips, and the tongue." He studied many cases where the projecting teeth seemed to be caused by tongue sucking. Figs. 3-6 show some of his devices to correct malocclusion of the teeth.

L. C. Bryan: Dental Review, 1892, page 859, under *"Surgical Treatment of Irregularities"* states—"The treatment which I have finally adopted is to inject cocaine and either partially cut away the thick intervening alveolus with drills and long fissure burs, or, when the alveolus is thin, bodily wedge the outer alveolar wall away with a half round, wedge-shaped chisel, by inserting the point of the instrument between the tooth crown and the bone, and forcing it up along the root until enough space is secured for the tooth to be brought out into place outside the lower tooth. This latter I formerly accomplished by pressing the above wedge-shaped instrument or the inner beak of a suitably formed forceps up along the palatal surface of the tooth until the crown was

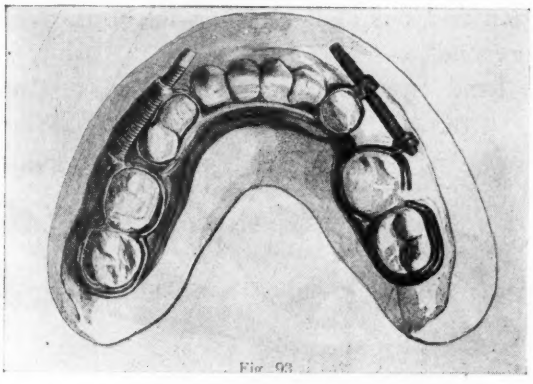

Fig. 4.

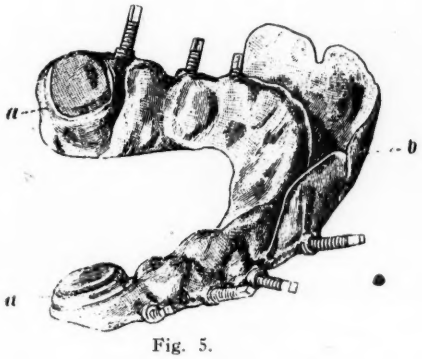

Fig. 5.

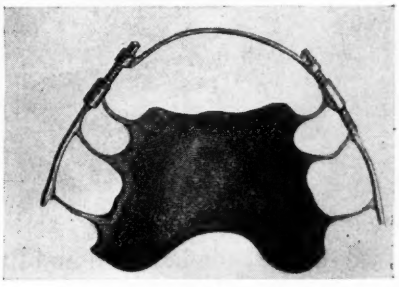

Fig. 6.

forced outward sufficiently to be firmly grasped. It was then brought gradually out into place, and secured with a small plate, or ligatures. My present method of operating on these cases is much simplified by the forceps and fulcrum which are herewith presented (Fig. 7).

"This pair you will see has lobster claw-formed jaws, or more resembles the Tapir's jaws with round drooping proboscis and the short receding lower jaw.

"This curved long round serrated jaw rests on a fulcrum fitted to the arch of the maxillary to be operated on, and the short beak pushes against the palatal aspects of the tooth to be brought out into line. I consider it absolutely necessary to lift the outer alveolar plate before attempting regulation on account of the great danger of accident to the pulp if the alveolar margin including the solid septa between the teeth is not broken up. The outer alveolar plate must be broken

up nearly as far as the apex, that the apex shall not be moved in its position, otherwise the nerve will be cut off by any considerable lateral movement of the point of the root."

Frank French before the *First and Second District Dental Societies, New York, Cosmos,* 1893, page 116, read a paper entitled *Orthodontia.*

"Congenital orthodontia is much harder to treat than acquired, as the forces of nature are all against us, and the teeth are more liable to return to their former position.

"The kind of appliances to be used must be determined by the judgment of the operator, and fortunately we have quite a list to choose from; but whether we choose levers, jackscrews, rubber plates and ligatures, piano wire, any or all of these, we will often find our skill and ingenuity taxed to the utmost to accomplish the desired result."

"I removed the band from the bicuspid and molar, and lengthened it so

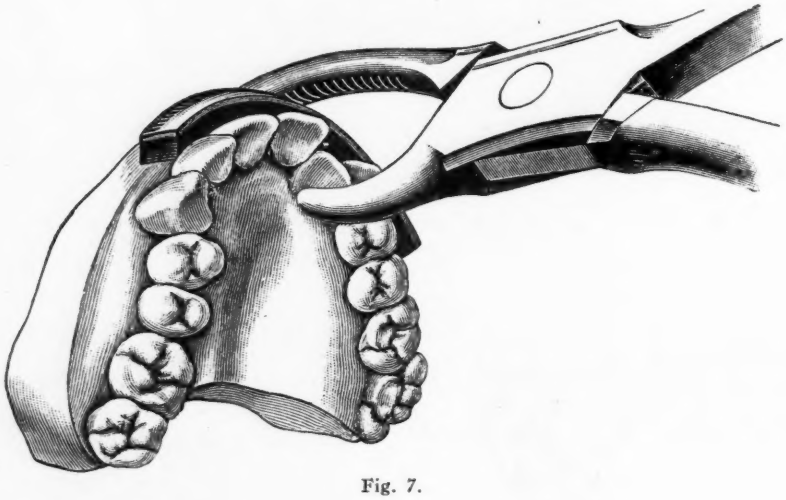

Fig. 7.

as to take in the second molar, and again attached my ligatures; this time they all moved, that is, the bicuspid and first and second molars moved, but the cuspid did not stir. Now, here was my error. The points from which the force was delivered were not so strong as the point of resistance; still, I think that almost any one would have made a similar mistake, as three teeth ought to have greater powers of resistance than one. I then made a rubber plate, with gold clasps around the bicuspids and molars on both sides, as they were in position and I did not wish to move them, and attached a spring of piano-wire with a single coil, starting from the posterior surface of the right cuspid, passing back of the incisors, and ending with a loop at the point I wished the left cuspid to occupy. I then attached with a silk ligature the wire loop to the eye on the cuspid, drawing it as tight as possible, and this time something moved, and it was the cuspid. I soon found, however, that this was drawing it in too much, and not moving it backward as far as necessary.

"I then made another rubber plate, but with a long spring extending from the right sixth-year molar to the left one, but without any coil, and ending in a loop. I attached this loop to the loop on the cuspid by a silk ligature drawn

tightly, so as to give tension to the spring, and the tooth was drawn into place without any further trouble. I used silk ligatures instead of rubber, because the wire spring gave it all the tension necessary. I placed small pin-heads on the plate, on both labial and lingual surfaces, at proper points, and attached rubber ligatures from lingual to labial pins, passing between the teeth, and the incisors and right cuspid were readily moved into position. The rubber plate extended in front of the lower teeth as well as in the rear, but is not shown in the diagram. The lower teeth being now in position, I swaged a thin plate of gold, covering the cutting-edges and extending downward on labial and lingual surfaces about one-eighth of an inch from bicuspid to bicuspid, including both, and cemented it firmly in position (Fig. 8).

"I then extracted the first bicuspids on both sides of the superior arch, for

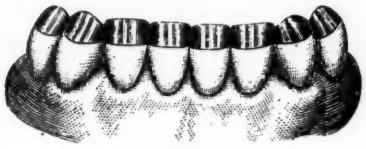

Fig. 8.

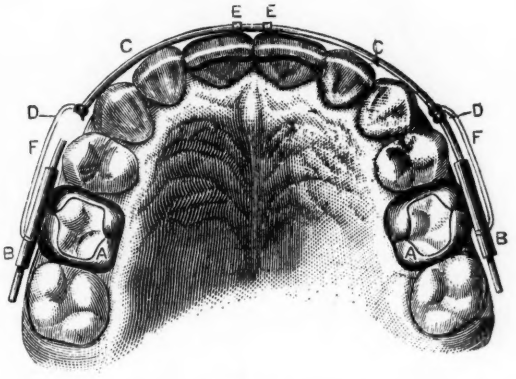

Fig. 9.

as all the teeth were equally good, there was no choice in that respect, and it gave one less to be moved on either side. Then an accurate impression of the first molar on either side was obtained, and a platinum band swaged so as to fit closely and coming up over the grinding surfaces a little (*A,A,* Fig. 9). On the buccal surfaces of each, and running at right angles to the long axis of the tooth, was soldered a gold tube about one-half inch in length (see *B,B,* Fig 9), and the band fastened firmly to the tooth with cement. A piece of gold wire, No. 18, long enough to reach around from second molar to second molar, was bent so as to form an arch of the shape desired for the teeth when in position, and fitted accurately to slide in the tubes on the molars and yet move easily (*C, C,* Fig. 9). At a point just in front of the bicuspid a narrow tube of gold was soldered on the gold wire (*D,D,* Fig. 9). A narrow band of platinum was swaged to fit each of the centrals, and a small groove of the same material was soldered to each band at right angles, a very little removed from the median line

(*E,E,* Fig. 9). This was to prevent the gold wire from slipping up and down, and also to hold another part of the appliance in position.

"The wire was then placed in position as seen in Fig. 9. A piece of heavier gold wire was then bent so as to conform somewhat to the shape of the mouth when closed, extending a little beyond the corners of the mouth and ending in a hook at right angles to the face. Exactly in the center, and at right angles, a piece of gold wire was soldered in the center, and at right angles, a piece of gold wire was soldered with a groove at the farther end to fit the arched wire already in the mouth, and of sufficient length to allow the lips to close readily when this was placed against the tooth. A silk traveling cap was adjusted to the back part of the head, two pieces of elastic braid were fastened to each side, one above and one below the ear, so that when brought together at the angle of the mouth the tension would be equal, and a small eyelet fastened in the end of each. A short rubber was looped around the regulating bar, just in front of the small tube, brought back and hooked over the end of the bar at this point (*F,F,* Fig. 9). The pressure from this rubber was not great, but was sufficient to retain what space may have been gained. The front bar was then placed against

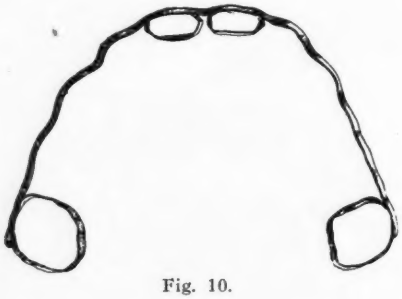

Fig. 10.

the regulating bar, the saddle resting against it at the median line, the elastic bands from the cap hooked to each end of it, and I had something that worked nights and Sundays.

"The pressure from this appliance was so great and got up so much inflammatory action that she was instructed to wear it only at night, the rubbers at each end retaining what had been gained.

"A retaining appliance was fitted; and now a word about retaining appliances. I believe that they should be made as light as possible, and retain the necessary strength. I also believe that they should be made non-removable as a rule, for I think they do the work better. Wherever I can, I use a small gold wire swaged so as to fit as closely as possible to the labial surface of the teeth. A piece of platinum is then swaged to fit the first or second molars as in (Fig. 9) whichever may be used. In this case, bands were also fitted to the two centrals; then all the bands were soldered to wire (see diagram, Fig. 10) and cemented to the teeth, and worn without removal for a year; after that, worn nights for six months to insure safety.

"This kind of a retainer is not inconvenient for the patient, does not look badly, and is cleanly. I use round wire instead of half-round, because there is less substance in contact with the teeth, and it is more easily kept clean."

H. Lindenberger, Cosmos, 1893, page 500: "A band is fitted to each of the central incisors and the two second bicuspids or first molars; the central bands are soldered together, at the same time attaching a small strip of plate, which upon being bent upward, forms a support for the center of the curved wire. Upon the palatal surfaces of the posterior band is soldered a section of split tubing, which forms a trough against which the extremities of the wire rest. When the appliance is thus far completed it is placed upon the model, and a piece of piano wire of sufficient length is bent to conform to the inner surface of the arch (assuming somewhat of a U shape). This wire, as will be noticed, is not attached to the other parts, hence admits of easy removal, either for cleansing, readjusting, or to substitute a larger or smaller wire, to produce greater or less pressure as the case demands (Fig. 11).

"A slight modification of this appliance may be made to include another class of irregularities; viz., protruding centrals.

"In such cases the first bicuspids, or possibly the cuspids, should be banded, instead of second bicuspids or first molars; then, proceeding as before, both

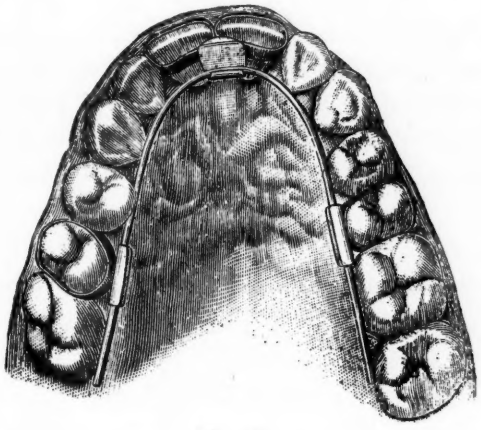

Fig. 11.

retraction of centrals and expansion of arch can be accomplished simultaneously.

"Should a tooth be inside the arch, by shaping the wire to strike this tooth it may be forced into proper position. A tooth outside the arch may also be brought back by attaching it by ligature to the wire.

"Thus while teeth may be brought into proper position in the arch, the process of expansion may proceed at the same time, if desired. This process is applicable with equal facility and effectiveness to either the upper or lower teeth.

"The simplicity of this appliance is not its only recommendation, as I feel sure that a trial will prove it to be of value for the purposes designed."

Dr. R. Wilder, Cosmos, 1894, page 831, before the Midwinter Dental Congress, read a paper on *Describing a Novel Appliance—Orthodontia:*

"The outer bands, constructed of spring gold, are divided in the middle and arranged with a suitable slide, so that the outer circle or band can be expanded or contracted, and fastened, making it capable of adjustment to any mouth.

The posterior teeth are used for anchorage always, and both expansion and contraction can be accomplished. In expanding, to prevent these teeth from collapsing a gold spring wire is used around the palatal surfaces and connected to the anchored teeth. The ball-and-socket attachment gives greater resisting power where the anchorage is not sufficient, and by its use the posterior teeth

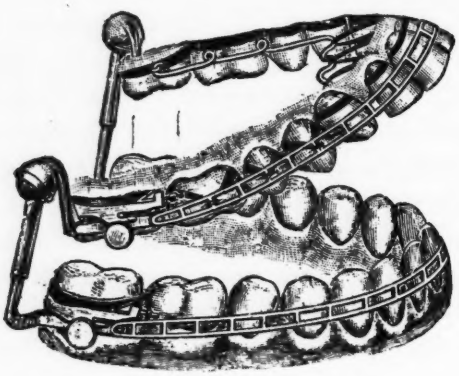

Fig. 12.

can be locked, and the lower made to move the upper teeth, and vice versa, without interfering with the labial movements. Teeth can be moved upward or down, backward or forward, outward or inward, or rotated without the use of bands; all the movements being produced with grass line or rubber tubing (Fig. 12).

DOCTOR GILMER—THE SURGEON*

By Vilray P. Blair, A.M., F.A.C.S., St. Louis, Mo.

IT is with some diffidence that I take advantage of this invitation. This hesitancy is not due to lack of preparation, because for twenty years I have been a student of Dr. Gilmer and his teachings, nor because I am conscious of my inability to do justice to the occasion, for I will rely upon my love and esteem of the doctor to carry me where my skill in word painting will fail. My dilemma is this: For me to speak of him at all is to laud some quality or accomplishment, and he is of such modesty of thought that fulsome praise has ever been an embarrassment to him. However, I have been talking about him behind his back for twenty years and I might as well come out and say it before his face regardless of consequences.

The qualities that most endear him to us and have the greatest claim on our respects and admiration are those which typify the true gentleman and the scholar, qualities that have kindness for their motif and truth for their objective. None who have any acquaintance with him, intimates or otherwise, need to be reminded of these; good taste rather forbids our commenting on anything so innate and evident.

It is of another phase, his contributions to the science and practice of surgery, that I would speak to you and I presume to do this for two reasons: I believe my needs fitted me to appreciate these to a greater degree than those who have been less dependent upon his teaching, and because comparatively few, who have not made a special study of his contributions, have any appreciation of their number and originality or the greatness of their value.

My personal acquaintance with the doctor began at a time when I was much more sure of myself than I am today, the occasion being a talk of his which I was asked to discuss. Before this I knew him only by reputation, which, enviable as it is, you all know seldom does him justice. The subject of his discourse was leukoplakia, and in the course of his talk he stated in his attractively diffident, and somewhat hesitating way, that he believed the lesion was a late consequence of syphilis. The array of data which he had presented was disconcerting to the prospective commentator but this last was something that gave me an opening. Butlin had made no mention of any such idea and I had found it nowhere else, though I knew the "Erb's Scar" was recognized as postsyphilitic. When called upon I fear I took an attitude somewhat similar to the Vice Chancellor of Oxford who, when asked to discuss the motion to admit women to the University, opened the subject by saying he was against the proposed movement for several reasons, first and foremost, because it was something new. In an-

*Given at the Testimonial Banquet to Dr. Thomas L. Gilmer, D.D.S., M.D., Sc.D., by The Chicago Dental Society, Chicago, March 23, 1920.

swering me Dr. Gilmer simply reiterated his belief. Twenty years of clinical observation backed by subsequently devised laboratory methods have since convinced me of the probable truth of his purely clinical deduction.

The clearest presentation with which I am acquainted of the principles upon which depend displacements of the fragments in a fracture of the lower jaw is to be found in Gilmer's "Oral Surgery." The doctor has credited the plan to some one else, but I have failed to find an adequate prototype. With such a broad knowledge of the basic causes, it is but natural that he should possess a proportionate grasp of the principles and details of treatment.

Hippocrates is, as far as I know, the earliest recorded authority to call attention to the suitability of the teeth as fixation points in fracture of the body of the mandible, and the recognition that the upper jaw is an ideal splint for a fractured lower probably dates back quite as far, but for two thousand years surgeons had been treating this fracture by a nonelastic head bandage and a chin cup, which we know gives about the same ultimate result as where no treatment has been used. It remained for Dr. Gilmer, a dentist practicing in a country town, to call attention to the simple and most useful procedure of wiring the lower teeth to those in the upper jaw which is today, in spite of the multitude of splints and devices at our disposal, the simplest and most universally applicable plan of effective treatment. There may be those here who will be inclined to disagree with this latter statement. But, while no disparagement to or lack of appreciation of good splinting devices is intended, I am prepared to support my premise. The fractures of the lower jaw that can not be efficiently treated by the Gilmer wiring are relatively few; a somewhat extended observation has convinced me that the dentists who can make and properly apply a dental splint are not in the majority, while on the other hand even a surgeon could wire the lower to the upper jaw if he had ever been told how. Many modifications of the original plan have been suggested—some of them improvements, though these but attest the breadth of the principle.

When we turn to the matter of splints we find this master mind still blazing the trail. As far as I can find out, Dr. Gilmer was the first to reassemble plaster impressions of the displaced fragments of a fractured jaw which is the first step to properly constructing a splint. There is one widely known as Gilmer's posterior band or intra-dental splint which not only utilizes the dental attachment, a property common to almost all jaw splints, but also helps to relieve the strain on the not always firmly fixed teeth by directly splinting the bone fragments which is the foundation principle of most all other fracture splints. Here again both simplicity and utility give this splint a very high rating.

In the treatment of the transverse fracture of the upper jaw I am not certain whether or not he first applied the reversed "Kingsley" splint, but he was at least one of the earliest and had worked out the plan independently.

It is ever his breadth of view that endows the manifestations of his mental concepts with the mechanical perfection which this work demands but controlled by and made subservient to the broad principles of medicine and surgery.

True genius is, I think, not measured by one's ability to juggle with the ab-

struse, but by the aptitude in adapting simple procedures to the solution of our every day problems.

One of the very useful devices in the dental bag of tricks is the soldered band cemented to a tooth which is so frequently used for fixation or traction. Strange as it may seem, this little device remained uninvented until Dr. Gilmer needed it to carry out some of his ideas; to devise it was therefore a perfectly natural thing for him to do.

Very lately, especially due to the opportunities afforded by the recent war, bone grafting to fill defects in the body and ramus of the lower jaw has been placed upon a firm basis, but before this the most practicable plan of compensating for the loss of a segment through the full thickness of this bone was a prosthesis that fitted into the gap against which the bone ends abutted. At least as a temporary expedient, it is still very useful. Dr. Gilmer was not the first to publish this plan, but he independently worked it out because, like the soldered band, he needed it to help him carry out his great object in life—to relieve his patients.

Speaking of war injuries and of splints reminds me of the device of the interlocking planes which allows the splinted jaw to open and shut but overcomes the tendency to a lateral deviation. This I knew was not a new device, but it was so useful in the treatment of war injuries and has been so frequently depicted in the reports of war cases that the majority came to regard it as a "war baby." It was with no surprise but with a distinct feeling of pride that I found this also we owe to our guest of the evening.

In times gone by it was a very much more common practice among good surgeons to remove one-half of the mandible for growths, even benign or only mildly malignant. Rarely was any restoration or retention apparatus applied, with the result that the body of the remaining half of the jaw, drawn past the midline by muscles and scar, was as useful to its owner as a paralyzed arm. It was Dr. Gilmer who first cried a warning against this promiscuous resection of the mandible for such neoplasms and pointed out that many of the tumors arising within the bone, even some of the sarcomata and alveolar carcinomata, could be enucleated or locally removed with little danger of recurrence. This warning has had a profound and beneficial effect upon the surgery of the jaws as practiced by well informed men.

Much as he regretted it, there occurred cases that required removal of half the mandible, but it was not for him to sit idly by and see a potentially useful half jaw rendered inert simply from it bad position. Such a jaw can be pushed back into place by inclined planes; but he discovered that if, immediately after the operation, the remaining part was wired in its normal occlusion and kept there for twenty-one days, it would retain both its position and its function without further mechanical help, a procedure the value of which many of my own patients can attest.

The pathologic anatomy of ranula has been a puzzle to many but he who is acquainted with Dr. Gilmer's writings will have various types clearly catalogued and will never confound ranula with obstruction of the submaxillary duct.

Dr. Gilmer pointed out the true mode of infection in periapical abscess and

was the first man I ever saw do a root amputation for its cure. That was quite a number of years ago and in spite of all that has been written and sometimes spoken quite audibly on this subject, I have yet to run across a single idea, either in technic or diagnosis, that has impressed me as a radical improvement on the methods he was using at that time. In fact, I doubt whether he has found reason to change his practice since then.

The repeated scraping out of pericemental pockets must be damaging to the remaining peridental membrane, which when once destroyed is never renewed. Dr. Gilmer's practice of eliminating the pocket by amputating the now useless and offending gum that forms the wall of the abscess as suggested by the elder Black has always appealed to me as a much more surgical procedure.

The Gilmer sharp steel probe is a little thing, the utility of which is now apt to be overlooked, but before the perfection of radiography of the bones it was the most apt means we had for locating and interpreting certain tumors and infections lying within the jaw bone, and still has a distinct place among diagnostic instruments.

The instances I have cited are but some of the contributions Dr. Gilmer has made to the practice of surgery. These and the many more I have not mentioned are but integral parts, cross sections as it were, of a scheme of practice that is truly great because it rests upon a profound knowledge of the physiology and pathology of the parts involved and a controlling sense of proportion.

The doctor has had a very large experience in operating upon odontomata and has given us not only an excellent classification, but has also clarified the diagnosis and the treatment.

I believe that Dr. Gilmer has the deepest knowledge and most wholesome appreciation of the pathology of the mouth of any one I know today. I know it to be a fact that many of the points that are being freely discussed today have been ticketed and filed in his mental card index for so long that he has almost ceased to mentally discuss them. Much of this was published by him in the seventies, eighties, and nineties. It was in the eighties that he wrote forcefully urging the dentists to associate the microscope with their practice.

It seems to me, it was a long time ago I attended a clinic given by Dr. Gilmer at an annual meeting of the Chicago Dental Society or some other local Saint's Day that the doctor made the impressive, and for him, somewhat startling statement that he believed every dentist there present was responsible for the death of at least one patient a year by neglecting to clean up periapical infections. I am almost ashamed to confess, even now, that the idea was new to me, but it impressed me so much that on my return home I wrote to him and asked if he really meant what he said. His reply was that he thought them to be responsible for the deaths of a great many more than one a year but did not like to say so. I went back to discuss it with him and he showed me the laboratory work he was doing, of the streptococcus he was almost invariably able to recover from these infected areas and root canals, all news to me and I think to most every one else at the time had they heard it, for it was long after this that I first heard the subject of focal infection being discussed in our dental and medical journals with anything of the exactitude that he then presented it to me. Be-

cause of their vital importance and the clarity with which he presents them, I believe his contributions to the pathology and treatment of infections arising about the teeth to be by far the most important that he has made and today he is exerting influence, almost as valuable, to limit the excesses being practiced in the name of focal infection.

One of the greatest handicaps the dentist works under in treating infections of the lower jaw that have invaded the soft tissues is his hesitancy of approaching it by an external incision. The doctor's surgical instinct has freed him from any such embarrassment and it is very good surgical practice never to make an intraoral incision for infections that have invaded the floor of the mouth or the submaxillary regions.

Probably one of the most talked-of diseases that the troops in the late war were subject to was the so-called "trench mouth" which, like a number of other things confronting the somewhat bewildered profession, seemed to be regarded as a new dispensation of providence or invention of the devil to further harrow the belligerents. It was not new and, from the German literature, at least, one could recognize it as an old enemy of the soldier both in barracks and in campaigns, but from these descriptions it was not easy to identify it as the gingivitis that created such havoc in the earlier periods of the late war and they offered little help in the treatment. However, to Dr. Gilmer's students, it has long been known by a different name—Gilmer's Gingivitis—because based on the sporadic cases occurring in his own practice he had recognized it as an entity and gave the first accurate description of its clinical characteristics and its effective treatment. Those who followed his teachings were not only previously acquainted with the lesion but went over knowing how to treat it, as was demonstrated by a number of them.

It is said in the Scriptures that "man can not live by bread alone," and it is equally true that one can not live by science alone either. To attain a position such as he has, one must have a goodly share of worldly wisdom too. The doctor is quite canny and has a fund of most excellent judgment from which in his generosity I have frequently profited—on cne occasion, however, it came too late to save me from embarrassment.

Some years after he had introduced me to peridental infections I was at a very large meeting devoted to the subject of focal infections which by that time had become quite generally popular. A great deal of the discussion was by some of the more radical element who, it seemed to me, were inclined to substitute antiseptics for surgical judgment; they were carrying things pretty well with them. Without hesitation, I got up and protested their practices and teachings feeling quite safe and comfortable in the thought that Dr. Gilmer would back me up, and not ill pleased at the opportunity of introducing his view of the subject. They skinned me alive by sheer weight of numbers and he absolutely failed to come to my rescue. Later I rather reproachfully asked him whether he did not agree with me, and he said, "Yes, yes, you were right in what you said, but I think you were foolish to have said it there."

We hold a brief against the doctor for not writing even more, but those who know him best are ready to excuse him on this count, regret it as we may.

Devotion to his patients, a most delicate consideration of his confreres, a regrettable timidity about protruding his views, and an absolute lack of desire for self-aggrandizement, all contribute to his poverty of literary output compared with the wealth of material from which he could draw. If, however, he has fallen short in this regard he has more than compensated for it in another. As the dean, leading spirit and inspiration of one of the greatest dental schools, he has devoted more than a full share of his energy instilling his views of surgery, dentistry and right living into his students who all over this country, today and for years, have been proving his precepts in their practice. However as time goes on, the impression received at college becomes dulled and needs sharpening by repeated contact with the whet. I feel that, in spite of all he has done, Dr. Gilmer owes us, if not a complete text book on oral surgery, at least a monograph on the pathology of the mouth and essential structures. It would not necessarily be a large book, but what it contained would be the truth and that is what we very much need.

Members of the dental profession too frequently have cause to justly criticize the ruthless disregard by the surgeon of the knowledge and help that the dentist can offer him when operating about the mouth. On the other hand, the surgeon not infrequently has occasion to feel that the dental viewpoint is somewhat hampered by a lack of working acquaintance with the broader principles of surgery. Regardless of the greater benefits that have resulted, certain drawbacks are incidental to dentistry having for a time shaken off the formal restrictions of the parental roof, and going forth to seek her fortune unhampered by the older surgical conventions. "It is not good for man to live alone," neither can any science reach its highest development independently. Dentistry has proved her case, but her very attainments have forced in both professions the recognition of the necessity of the closer union toward which we are tending. Dr. Gilmer is the ideal prototype of this union.

He has taken all that the Science of Dentistry could give him, and has given to dentistry in return in fair proportion to what he has received. At the same time he is thoroughly in touch with and guided by the broadest principles that underlie the practice of surgery and he has given to surgery more than he ever gave to dentistry. You regard him as one of the great lights of the dental profession—I would acclaim him as a very great surgeon.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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THE CONTINUOUS ADMINISTRATION OF N_2O IN DENTAL SURGERY*

By W. A. Rail, M.R.C.S., L.R.C.P.

IT was with considerable nervousness and hesitation that I acceded to the request of your secretary to read you this paper on N_2O in dental surgery, with particular reference to the continuous administration by the nasal method. In reading a paper on this subject before a gathering of dental surgeons, one must necessarily go over ground which has been well travelled by one's hearers, and therefore, should I put before you particulars with which you are already familiar, I can only ask your forbearance.

My hope is that on one or two points I shall be able to preesnt this subject to you in a light in which you have not seen it before.

In administering N_2O gas the anesthetist has before him the purpose of obtaining a good surgical anesthesia with complete safety to the patient, while allowing the operator as long a time as he desires to complete his work.

At one time it was the universal practice amongst dentists to administer gas without the admixture of any air or oxygen, thus producing an anesthesia to the point of asphyxiation, when after the removal of the mask, the offending tooth, or perhaps teeth, could be extracted. This is *the* dangerous method, and 90 per cent or more of the fatalities under gas have been caused by this practice of administering gas without air or oxygen. After anesthesia by pure gas one can hope for a maximum operative period of about 60 seconds, and this is considerably shortened in most cases; whilst in the case of alcoholics and other types of cases one obtains a very transient anesthesia with a comparatively great risk of fatality.

This method is now out of date, and I will not consider it further.

To administer gas in safety about 8 per cent of oxygen, or 40 per cent of

*A paper read before the Dental Society of the Cape Province, South Africa. Published in the South Africa Medical Record, April 24, 1920.

air by volume, should be mixed with the gas. For surgical operations it is better to use pure oxygen than air, by this means eliminating the 32 volumes of nitrogen gas which is contained in the 40 volumes of air, and obtaining a more tranquil anesthesia; but for dental operations air answers the purpose perfectly well, while making the apparatus less bulky and cumbersome.

Considerations of the above nature led Paterson to begin the practice of allowing the patient to breathe a small quantity of oxygen with the gas, in order to eliminate from the administration of gas those dangers which had previously limited its use. His methods were quickly taken up, and it was found that N_2O, with the admission of the correct amount of oxygen or air, produced an anesthesia which in most cases could be prolonged for a time sufficient for the performance of any dental operation. The classical case recorded lasted for over 30 minutes, and stopped then only because the operation was finished. Not only was this the case, but it was noticed that the after effects of the continuous anesthetic were at least as slight as those of gas administered by the old method.

There are many forms of apparatus in use at the present day, and they all have the same essentials. I have the apparatus I use here tonight, and any one who wishes to can see it. Instead of the ordinary face-piece covering both mouth and nose, this apparatus has separate mouth and nose pieces, joined together by a patent rubber tube. In the nose-piece there is a valve which can be opened to admit air. The gas, after passing through the bag, flows into the nose-piece and then along the connecting tube into the mouth. If desired, a bag and tube with a graduated valve can be attached to this apparatus, when the desired mixture of pure oxygen and gas can be administered. Although a more even and slightly deeper anesthesia is obtained by the use of oxygen instead of air with N_2O gas, in my opinion it is not necessary in the anesthesia required for dental surgery; and the high cost of oxygen in this country, together with the increased bulk of the combined apparatus, prohibits the use of gas and oxygen, as opposed to gas and air, in dental work. As I have said before, N_2O combined with air gives a very satisfactory dental anesthesia.

Of all anesthetics N_2O with air is the most difficult to give successfully, and for this reason: that the signs of anesthesia, when the anesthetic is well given, are at first very faint and difficult to perceive. As the anesthesia is prolonged the signs may become more pronounced, but if the anesthetist waits until this is so, he will have wasted many seconds of the operator's time. Cyanosis and jactitation—the results of too little air—must be avoided, and these were two of the principal signs in the old method of administration. Cyanosis is dangerous, and a little air given when necessary will obviate this danger. By the old method of giving gas an anesthesia of suffocation was produced, so that cyanosis was always present. The admission of oxygen produces true anesthesia, and to get cyanosis is a sign of a badly given anesthetic.

Jactitation, also a sign of suffocation, must be avoided, and especially when anesthetizing a pregnant woman.

Struggling, at the beginning or during the administration, means that the patient is getting too much air or oxygen.

Stertor is your principal sign. It may be so faint that you can not hear it, but a finger placed lightly on the pomum Adami will tell you when stertor begins, and will distinguish between false and true stertor. Again, it is frequently absent. Automatic repiration, slightly rapid sluggish, pupillary reflex, and twitching of the orbicularis palpebrarum muscles will also act as guides, and it is on these that you must depend when stertor is absent.

I know that all these signs may be found on reference to any text book, but I repeat them to emphasize that fact that, in a good anesthesia by gas with air or oxygen, cyanosis and jactitation, and very likely stertor, will be absent, and it is on very little evidence, seemingly, that the anesthetic will tell the operator that he may begin.

As with all anesthetics, there must be some amount of preparation. If the operation can take place between 9 and 11 a.m., abstention from breakfast will suffice, but the patient should take an early cup of tea with a rusk or biscuit. For operations later in the day, the patient must have had no food for some four hours previously. I am not in favor of a severe purgative the day before; it is too depressing and relaxing.

Nitrous oxide by itself is of little use to dentists owing to the shortness of the anesthesia. N_2O with air or oxygen, nasally administered, will give a sufficiently deep anesthesia with complete relaxation for all dental operations, and can be prolonged until the operation is finished in suitable cases; and the great majority of cases are suitable for this anesthetic. Why, then, should a powerful anesthetic like $CHCl_3$ be used, say, for a full clearance, when the same can be done with less trouble to all parties concerned, and with practically no risk to the patient, by the use of continuous gas in the dental chair?

In comparison with other anesthetics N_2O with air or O_2 for dental purposes stands alone, but there are certain contraindications and difficulties which I will mention after I have described what I consider to be the best and safest methods of giving N_2O. Let me now say that at present the cost of gas in this country is almost prohibitive to its extensive use, but I believe that Messrs. Petersen, Ltd., are about to undertake its production at their Johannesburg branch. For some reason the climatic conditions of South Africa make good N_2O anesthesia less easy to obtain than in England.

The best method of administration of gas for any purpose whatsoever is one by means of which you can control any emergency that can possibly arise. If you use any modification of Teter's apparatus, where you can pass your gas and O_2 over warmed ether or C. and E. mixture at will, you have an anesthetic with which you can control your patient for any surgical operation, major or minor. Should it be possible for an anesthetist to have a room, properly fitted where all gas cases could be brought to him and attended to by their own dentists, this form of apparatus could be used and perfect anesthesias result. But the apparatus is too bulky to be carried from surgery to surgery. Using the easily portable form of apparatus before described, I give my dental anesthesias as follows:—

A small prop is placed as far back as necessary in the mouth. The nose and mouth-pieces applied must fit accurately; there must be no leakage. Should

the cheeks be sunken, a pad of cloth can be applied and a slight positive pressure can be kept up in the bag. The patient is made to inhale gas for some eight breaths, expiring through the valves, then she is given a breath of air. Allowing another eight breaths or so of gas, she is given another breath of air. This is continued, judging the amount of air required by the color of the patient. Should her breathing be shallow, allow her to rebreathe until the respirations are deeper, and you will notice that they become quicker and more automatic as the patient approaches anesthesia. You will see that the muscles relax, and perhaps the face muscles may twitch and the pupils dilate slightly with some sluggishness of or absence of conjunctival reflex; and you may see or feel stertor. One or more of these signs may be present, and the patient will be anesthetized and ready for operation. The time necessary for the induction of anesthesia may be from two to ten minutes, or even longer, but generally is between two to four minutes. Now remove your mouth-piece, and the operator can begin. Keeping your hand on the firmly applied nose-piece, you can admit air when necessary, cause the patient to rebreathe or to expire through the valve at will; and in most cases, particularly in women and children, anesthesia can be prolonged to the end of the operation.

Some authorities suggest that the rebreathing be started at the commencement, giving alternate periods of eight breaths into the bag and out through the valve. This is good, especially in the case of men, as it deepens the respirations and more quickly anesthetizes this, the most difficult type of gas patient. It saves gas also, to the anesthetist an important consideration.

On the insertion of the prop some patients are liable to gagging or retching. If necessary, one can do without a prop and insert a gag at the beginning of the operation.

During the administration pallor must be carefully treated, and the anesthetic may have to be stopped if this sign can not be relieved. Sudden pallor in the young is often a warning of syncope.

There is one thing I have noticed, and that is the occurrence of sweating associated with pallor in the case of young men, who all admit to a history of rather heavy smoking, with the use of a certain amount of alcohol. In these cases it is better to give a little ether, or sometimes to stop the anesthetic altogether, rather than to run the risk of continuing.

Cyanosis in the elderly needs plenty of air, but I see no reason for giving gas to old and stout people. Should an anesthetic be necessary, it is better to give $CHCl_3$ in most cases of this class.

For children, when deciduous or early permanent teeth are to be extracted, gas with air is not so good as ethyl chloride. Given without a bag, in a slightly open method, the quick results of E.C., the pleasant smell, and the deep anesthesia obtained for a time sufficiently long for the work in hand, make it a much more pleasant anesthetic for children up to the ages of 10 or 12.

In older people E.C. can be used if the operator is sure of the amount of time he requires, but where this can not be gauged, say in the attempted extraction of a difficult lower wisdom tooth, it is always better to have continuous gas given to be on the safe side.

For old people, alcoholics, fat people, and people whose arteries are sclerosed,

gas with air or O_2 is not a good anesthetic. These patients go under very slowly, and the gas must be pushed, very often to a considerable degree of cyanosis, to keep them properly insensitive. The blood pressure rises considerably; and at times it is difficult to produce, much less prolong, anesthesia at all. In cases of this description there is considerable danger, and I prefer to administer $CHCl_3$ or ether when an anesthetic is needed.

I have found that the best type of patient for gas anesthesia is the fair, nervous woman between the ages of fifteen and forty-five. All normal women in this period of life take gas well, but you will find that, when giving gas to women in the second period of life, you will occasionally find it necessary to have recourse to your ether bottle in order to bring about a satisfactory degree of anesthesia. And this patient is almost invariably dark-complexioned.

When dealing with men, your first question is whether the subject takes alcohol or not. If he has a history of abstinence from, or of great moderation in alcohol, then you will get a result similar to that of a woman of the same class; but should your patient be accustomed to alcohol, say even to the extent of two or three whiskies a day, then you will not easily induce anesthesia with gas, nor will you be certain as to whether you will be able to continue the anesthesia or not.

In these cases I usually induce by means of gas through a bag attached to a Clover's inhaler, so that I can use ether as well if required. If I find that gas alone is required, it is easy to change to the nasal apparatus. But as a rule, for a long anesthesia in this class of case, one needs to pass one's gas over the surface of ether or C. and E. Mixture. I am now referring to men between the ages of 30 and 50. Men and boys under 30 usually respond very well to continuous gas. To men over 50 I give gas as seldom as possible. I think it dangerous to use this anesthetic in these cases. You can not be sure of the condition of any man's arteries, and most men of today are moderate or immoderate drinkers. As I have mentioned before, a modified form of Teter's apparatus is the best, and one could be installed very easily in the extraction room of every dentist, when the anesthetist's work would be greatly eased; or, an extraction room common to all dentists engaging the same anesthetist could be arranged, where the dentists could bring and work on their own patients, leaving the after treatment to the anesthetist, thus saving the time of both dentists and anesthetists. This is done to my knowledge in at least one city in South Africa.

One of the greatest impediments to successful nasal anesthesia is habitual mouth-breathing. Should the nasal passages be partially blocked, then the anesthesia will not be continuous but intermittent, as the operator will have to stop from time to time to allow of the re-application of the mouth-piece. One of the commonest causes of mouth-breathing is the dentist himself. In extracting lower teeth it is the common practice of the operator to depress the tongue with his fingers, thus making an airway through which the patient breathes. Normally, the upper surface of the back of the tongue touches the soft palate, completely closing the airway. If you depress the tongue you draw it forward, and an airway is opened; the patient uses it and returns to consciousness. The anesthetist is blamed for a poor anesthesia when it is hardly his fault. I have

worked with dentists who realized this, and always obtain my best results with these men.

As I have said before, old and stout people, and people in which arterial degeneration is suspected should not be given gas.

Valvular disease of the heart, properly compensated, is no reason for the withholding of continuous gas. There is no danger provided that the heart is compensating properly, and that sufficient air to avoid cyanosis is given.

Continuous gas can be given with perfect safety to pregnant women. In fact, it is preferable to a local anesthetic in dental work in that it avoids all the shock of the extraction and the after-pain of the local injection. Again, sufficient air, but not too much, must be given, and all cyanosis and jactitation or struggling and excitement must be avoided.

Patients suffering from large goiter, enlarged glands, or any neck condition likely to cause difficulty of breathing, should not be given gas, but in this class of case continuous gas is not at all dangerous, as compared with gas given by the old method. The avoidance of cyanosis and congestion by the admission of air does away with the fear of undue pressure on the trachea. Still, this is not a desirable class of case for gas anesthesia.

In the course of hospital work one has to give gas to all-comers, but in this class of case, and when working on oldish men, the rigidity of whose arteries was unmistakable, I would have preferred to use a general anesthetic.

You will see, then, that there is no reason for not using, in fact, I may say there is every reason for using, continuous gas for dental anesthetic purposes.

(1) Nitrous oxide is by far the safest anesthetic.

(2) It can be given to all normal people, particularly between the ages of ten and fifty.

(3) It gives a long anesthesia, and in this way and by reason of its safety is greatly superior to ethyl chloride, which latter is less safe when given continuously.

(4) It is given in the sitting-up position in the dental chair, and the patient is ready to go home a few minutes after he has recovered from the anesthetic.

(5) It saves the dentist much time when used instead of either another general anesthetic or a local injection for a number of teeth.

(6) It has no after-effects. Headache, vomiting and sickness are practically unknown, and the after-pain of injections is avoided.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

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It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

DENTAL RADIOGRAPHIC PATHOLOGY

With the Presentation of Interesting Cases

Dr. George Palmer Ratner, New York, N. Y.

RADIOGRAPHY in the last few years has established itself so firmly as a diagnostic agent in the practice of dentistry that the writer will endeavor through the presentation of the following cases to show that dental radiography must be practiced as a specialty to attain the proper radiograms and correct interpretations.

It was a great surprise to hear certain reputable men state at a dental convention held at the Hotel Commodore in New York recently, that there was no justification for specialization in dental radiography, and that a diagnosis given by one specializing in this branch of dentistry should not be accepted.

The contention appeared to be that unless the general dental practitioner takes the radiogram personally and knows the clinical history, radiography can not be practiced correctly. This argument if it is what the writer understood it to be, can conclusively be proved weak, since in the majority of cases presented that came under my observation, it will be noted that the patients went through the hands of general dental practitioners who radiographed them without disclosing the findings correctly. It was evident that the general dental practitioner failed in his radiography because of doubtful and inconsistent technic, which inevitably results in an erroneous finding and interpretation.

I desire to state emphatically, so as not to be misconstrued, that clinical history is of paramount importance in rendering of an interpretation of a radiogram.

In radiography there are three primary technical factors involved; *first,* position and style of negative to be used; *second,* exposure, which includes consistency of tube; *third,* the development of negative. It is becoming increasingly evident that radiography has reached the stage of an exect science requir-

ing the development of a carefully laid out technic and any deviation from this fixed technic will inevitably result in an improper radiogram resulting in an incorrect interpretation. The general dental practitioner has so many duties to perform in his endeavors to conserve the teeth that consistency of technic is usually lost or this feature of the work is assigned to a technician who works more or less mechanically.

To be able to interpret any radiogram, one must know definitely the anatomy of the parts involved and the various type shadows these parts present upon the negative when exposed. It so happens that the general dental practitioner does not come across as great a variety of dental pathology in his own practice as the radiographic specialist, and therefore he can not acquire so keen a diagnostic ability since he is confined to a narrower and more limited field of work.

The general dental practitioner should recognize this fact and be guided by the opinion of the radiographic specialist, but should only accept his verdict if the clinical findings substantiate the radiographic ones. After all radiography is a means of diagnosis and the nearest one we have to a positive one.

Two common fallacies in interpretation often brought to my attention are, first, the antrum shadow created over the apices of the molar teeth which was diagnosed as a cyst or infection, about these teeth: second, the shadow of the mental foramen sometimes situated close to the apices of the inferior premolars diagnosed as an apical focal infection about one of these teeth.

Usually when the general practitioner takes a radiogram he confines his work to the No. 1 film and herein is a false procedure in technic. Cases will be shown where it was impossible to disclose the pathologic condition present due to the limited area exposed upon this small negative.

In the complete radiographic examination of the oral cavity in a large number of patients, it was rare to find a perfectly healthy condition, especially where dental restorations or corrections were performed. Since so many constitutional disturbances have been traced to the teeth and adjacent tissues it is only a question of time when the mouth must become a gauge to the individual's health. It seems certain that in the very near future, when a physician makes a physical examination of a patient, he will insist upon a radiographic one of the teeth and the adjacent tissues to determine the existence of any pathologic conditions, the same as he insists upon the examination of the urine for the determination of the presence of sugar or of the blood in a Wassermann test, in order to eliminate as soon as possible this source as a possible cause of a constitutional reaction.

Obscure cases which have resisted the efforts of all medical aid were readily treated by the discovery of the fact that the etiological factor lay hidden away about the oral cavity. Constitutional disturbances, resulting in rheumatic arthritis, endocarditis, and gastrointestinal conditions, have so often been traced to the teeth, where foci of infections were disclosed about the apices or adjacent tissues, that an earlier radiographic examination as a preventive measure, would have gone a great way in forestalling such ailments as ultimately befell the individuals.

In a timely and interesting article entitled "The Relation of Oral Infections to Mental Disease," which appeared in the *Journal of Dental Research* of De-

cember, 1920, Dr. Cotton, of New Jersey State Hospital, Trenton, N. J., has shown that by the correction of certain dental pathologic conditions existing in the oral cavity a great percentage of cures has resulted.

It is not my contention that all ills and ailments can be attributed to the teeth, but after the elimination of all possible causes it has been found that where a pathologic condition existed about the oral cavity the correction of it very often leads to a complete cure.

Before entering upon the discussion of various cases, a word is timely relative to the commercial x-ray laboratories. In the last few years these laboratories have come into existence and I believe no greater form of quackery has arisen, both for the medical and dental professions and also for the laity, and not until the professions as a whole unite, can this evil be curbed. A great many cases have been referred back to me for radiographic confirmation of the findings

Fig. 1.

by these laboratories, and it is my belief that through the "promiscuous x-raying" of the teeth and the unscientific interpretations given to the profession, and diagnosis to the laity upon their request, many individuals are unnecessarily losing teeth, which in the hands of conscientious and skillful dentists could be conserved.

The citations of the following cases are from private practice and some are taken from the Vanderbilt Clinic where I spent some time as a radiographer, and where it was possible to ascertain clinical results or operations performed, they are described.

The form of examination in all cases is clinical history and radiographic interpretation. At no time do I feel that the radiographer should give a prognosis, course of treatment, or results from a radiographic examination, because this is beyond his field of operation and should be left entirely to the dentist's judgment.

Case I.—*Clinical History.*—Patient, male forty-three years old, suffering

from chronic suppuration in the mandibular left third molar region. Operated upon for this condition twice, but no permanent cure resulted. Patient was told that both the second and third molars were removed. Radiogram taken on small dental film did not disclose any definite cause for this suppuration. Entire area anterior to third molar region necrosed and infected.

Radiographic Interpretation.—Entire left side of mandible taken on an 8x10 plate discloses fully developed third molar embedded in the ramus at the angle of the jaw. Area anterior to this impacted tooth and up to the second molar necrosed and infected. (Fig. 1.)

Clinical Result.—Fully developed third molar removed, area curetted. After several weeks complete recovery took place and permanent cure resulted.

Note.—Patient was radiographed previously but all radiograms being confined to small dental films, the etiologic factor was not ascertained.

CASE II.—*Clinical History.*—Patient, female. After an extraction of a mandibular left first molar severe neuralgic pains developed. This pain which be-

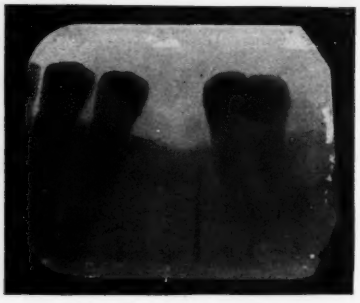

Fig. 2.

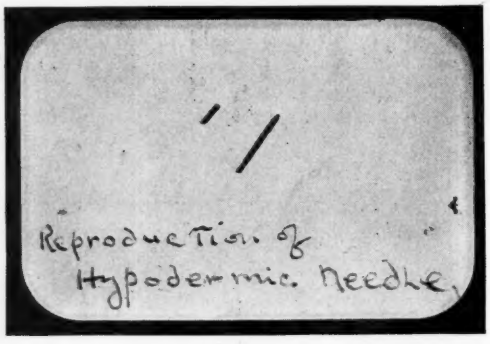

Fig. 3.

came worse for the last three years, developed into characteristic douloureux. Pain had a tendency to localize in certain teeth, and patient had these teeth extracted periodically, six were removed through this procedure hoping to relieve the condition, but without any success. Alcohol and ether injection gave temporary relief. As a last resort sought the aid of a surgeon who suggested the resection of the gasserian ganglia. The patient went to several prominent neurologists, physicians and dentists for this condition and it appears at no time was a radiographic examination of the teeth or oral cavity suggested. In examining the oral cavity all the teeth with the exception of an inferior molar which had a filling were normal, and gums healthy. Complete radiographic examination of the oral cavity made.

Radiographic Interpretation.—In the mandibular left first molar area a foreign body was present, which appeared to be a hypodermic needle about half an inch in length, situated perpendicular to the mandibular canal and penetrating the nerve. At first it was suspected that the needle was external to the alveolar process in the soft tissues, but was found to be between the alveolar plates of process. (Figs. 2 and 3.)

Clinical Treatment.—Dissection of the soft tissues external to the alveolar

process did not disclose any needle, but situated between the external and internal plates there was found a corroded needle about three-quarters of an inch in length which was broken in the removal of same. It appears that the needle was broken at the hub during the administration of losal anesthetic for extraction.

Note.—This case is of extreme importance in that the patient was about to be operated on for the resection of the gasserian ganglia. At no previous time was a radiographic examination suggested of the oral cavity. In all neuralgic disturbances about the head and teeth, the examination of these parts radiographically is of paramount importance before any other procedure is suggested.

CASE III.—*Clinical History.*—Patient, male, 38 years. Small area present in the palatal region above central teeth, which upon probing disclosed a large hollow. All teeth in the maxillary arch normal and vital to all appearance. Patient gives history of three-plus Wassermann reaction.

Fig. 4.

Fig. 5.

Radiographic Interpretation.—Large area of necrosis present about the centre of the palate, teeth normal, small filling in central made to test vitality of this tooth which was suspected as devitalized. Diagnosis large area of necrosis. Specific origin, tertiary lesion, gumma of palate. (Fig. 4.)

CASE IV.—*Clinical History.*—Patient, 33 years. Chronic pus discharge from the palatal region above central teeth. Right lateral and central teeth crowned.

Radiographic Interpretation.—Large cyst formation above centrals and lateral teeth present. All crowned teeth disclose poorly filled canals. These teeth were the cause of this large area of necrosis and infection. (Fig. 5.)

Note.—These cases are presented together since the clinical manifestations were similar in reaction as determined radiographically, but having two different etiologic factors. Case III, which was due to a specific condition, could not be corrected without proper medication under a physician's supervision. Case IV

which was due to poor dental operations about the teeth was corrected by the removal of the diseased teeth and curetting the area, resulting in complete bone regeneration. In the specific necrosis the ravages of the disease were checked by proper medication, but the destruction of bone was permanent and perforation had to be closed by a mechanical appliance.

CASE V.—Patient, female, thirty years old, suffered from severe headache for several years. Examination of oral cavity disclosed the absence of any third molars superior or inferior. No history of any eruption or extraction of third molars. Patient had one third molar area radiographer (Fig. 6) and an unerupted third molar was disclosed. Several weeks later patient came back for a complete mouth examination to determine whether any other third molars were present.

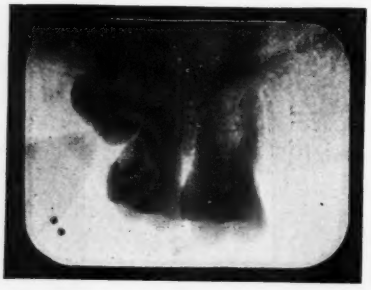

Fig. 6.

Fig. 7. Fig. 8. Fig. 9.

Radiographic Interpretation.—Fig. 6. Maxillary left third molar unerupted and impacted against second molar.

Fig. 7. Mandibular left third molar unerupted and impacted against second molar.

Fig. 8. Maxillary right third molar unerupted and impacted against second molar.

Fig. 9. Mandibular right third molar unerupted and impacted, in the body of the mandible close to the mandibular nerve.

Note.—In all disturbances about the head and teeth it is important that the oral cavity be considered as a unit of study. This case disclosed four impactions of different types in one individual.

CASE VI.—Patient, male, nineteen years old. Swelling of the chin present. About three years ago had similar swelling opened by physician and at the time it took several weeks to heal. At present, swelling large and area inflamed,

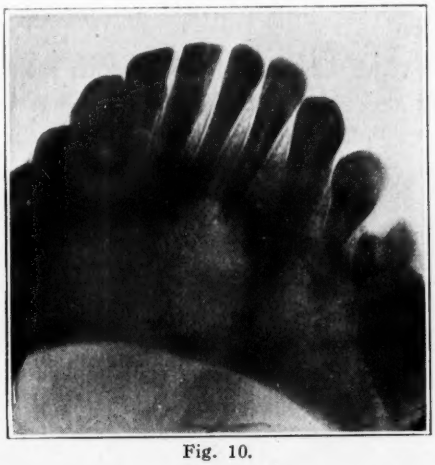

Fig. 10.

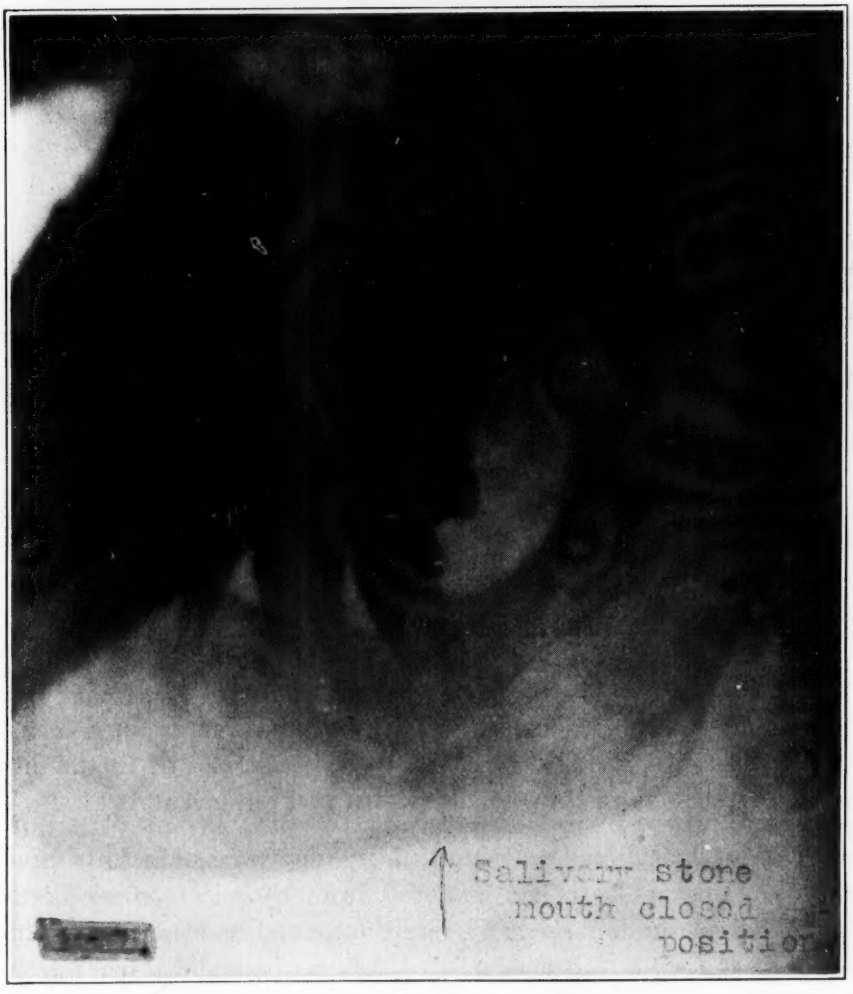

Fig. 11.

right lateral appears discolored. No radiogram was taken previously to present one.

Radiographic Interpretation.—A cyst formation situated in the region of the medium line below the mandibular incisors. The right lateral is a devitalized tooth. (Fig. 10.)

Clinical Result.—Devitalized right lateral tooth treated, and entire area of necrosis curetted. After several weeks permanent cure took place.

Fig. 12.

Note.—This case as originally treated by a physician resulted in a temporary cure, but the origin was dental. In all obscure cases of this nature there must be closer cooperation between the dentist and physician.

CASE VII.—*Clinical History.*—Male, thirty-nine years old. Last three years, previously to being radiographed, suffered from chronic swelling of the submaxillary gland on the left side. During this period had incision of the gland made to evacuate pus which accumulated, but no permanent relief from these treatments. Several dental films were taken and it was decided that mandibular

first molar was the cause of this trouble. The dentist refused to extract this tooth because there were no symptoms of its being devitalized, and he referred patient for a more complete radiographic examination. Plates of this side of the mandible were taken.

Radiographic Interpretation.—Film discloses mandibular left first molar normal. Plates (Fig. 11 mouth in closed position) disclose a mass about the size of a sweet pea, having the same density as tooth structure or bone, situated beneath the apices of the second molar and slightly below the path of the mandibular nerve. Fig. 12 discloses same mass situated beneath the apices of the second molar but more in the path of the mandibular nerve. Diagnosis, salivary calculus (stone) in the submaxillary gland. This stone probably obstructed the duct causing retention of fluid from this gland and interfering with the function of the gland, producing ranula.

Note.—Radiograms taken were confined to small films, and tooth diagnosed

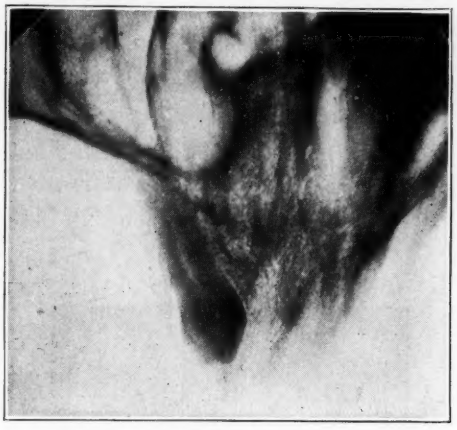

Fig. 13.

as cause was normal. Entire gland was enucleated and salivary stone found therein.

Case VIII.—Patient, female, nurse. Suffering from severe headaches for the last eighteen years. Sought the aid of any number of specialists and received various treatments but at no time did patient become relieved from these severe headaches. Wore a full upper plate; the mandibular incisors and canine present. Her dentist radiographed the mandibular teeth, but did not bother about the upper jaw because the patient wore a plate, and the gums appeared healthy.

Radiographic Interpretation.—Mandibular teeth normal. In the maxilla on the left side, embedded in the alveolar process, near the alveolar ridge, there was present a fully developed canine tooth. (Fig. 13.)

Clinical Treatment.—Permanent tooth removed. Six months later headaches had lessened to a marked degree and the patient said, "I think we have struck the cause."

It is a false procedure at any time to take for granted any supposition as regards the normality of a part unless definitely known. In this particular case, because the patient wore a full upper plate, the maxilla was not radiographed,

and the cause was not found. The oral cavity must be considered as a unit, not as a sectional part, for a complete diagnosis.

CASE IX.—*Clinical History.*—Patient, female, twenty-seven years old. Seven months pregnant. Developed growth above the canine region on the gum about size of a hazel nut. Very vascular, and least irritation causes bleeding. Growth

Fig. 14.

Fig. 15.

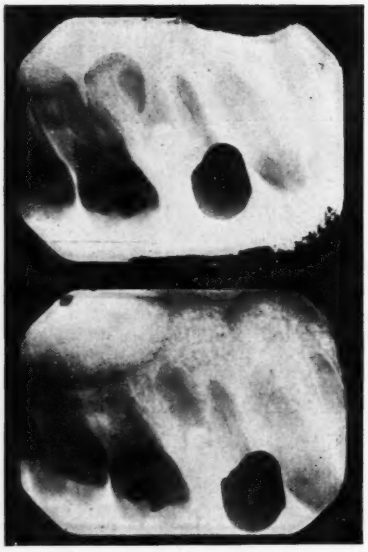

Fig. 16.

appeared benign since size remained constant for the last three months. There appeared to be no root present, lateral normal, canine recently extracted.

Radiographic Interpretation.—Fig. 14. Alveolar process is not regular and a small spine-like process present, which is probably the septum of bone between the canine and lateral incisor. Fig. 15 shows the size of the epulis with direct

attachment to this irregular, spine-like process. Diagnosis, epulis due to irritation from this irregular process.

Clinical Treatment.—Radical removal including the lateral tooth for the prevention of a recurrence of same.

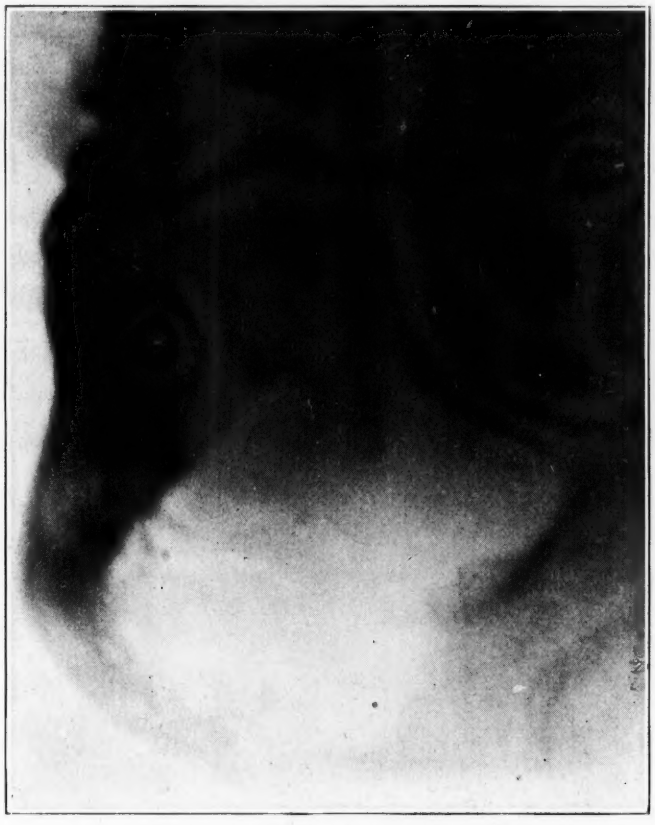

Fig. 17.

Fig. 18.

Note.—These growths known as benign epulis occur frequently in pregnant women, probably due to some change in metabolism during this period. To determine as to whether the growth is benign or malignant in character, a small section should be made and examined microscopically by a pathologist before operating. At no time should a growth about the oral cavity be neglected, as it may become malignant in time. The etiology of an epulis usually lies in some local irritation as a root, shell crown, bridgework or as in this case of ragged alveolar process.

CASE X.—*Clinical History.*—This case is presented because of the rare possibility of an error in interpretation due to a defective film or artifact in a film. The upper film was taken and when developed both films disclosed what at first appeared to be an unerupted second premolar tooth or malformed tooth above the canine area. The second film taken immediately afterwards and confirmed by

Fig. 19.

several more did not disclose any similar condition, and upon close examination of the first negative it appears that there was a decided defect in both these films. There was present a second premolar root only. (Fig. 16.)

Note.—In determining any abnormal condition that may occur, at no time should one negative be relied upon, but several should be taken, and at different angles.

CASE XI.—Patient, female, twenty-eight years old. Mandibular right premolar and molars removed, because of large swelling and apical alveolar abscesses. Suppuration from this area for several weeks previously to being radiographed. Recovery very slow after extractions.

Radiographic Interpretation.—Fig. 17. Entire area from the mandibular premolar to third molar region disclosed that the entire body of the mandible on this side was necrosed and infected, extending to the inferior border of the jaw. Diagnosis, pathologic fracture of the inferior mandible due to necrosis.

Fig. 18 is same area radiographed six months later showing marked bone regeneration taking place.

Note.—In order to ascertain whether bone regeneration of any given area has taken place, a number of radiograms should be taken periodically, and by a comparative study, note the difference in bone structure.

CASE XII.—*Clinical History.*—Patient, fifty-five years old. Entire left side discloses large growth in the oral cavity and mucous membrane from the mandibular left canine ulcerated and broken down. Probing the bone in this region showed it to be necrosed. Very foul odor present. Glands swollen. Suspected carcinoma present and appeared very malignant because of rapid growth in the last few weeks.

Radiographic Interpretation.—Entire area from the canine to third molar discloses body of the jaw broken down and a necrosed mass. (Fig. 19.) Diagnosis, carcinoma of the mandible. Inoperable.

Clinical findings of growth was carcinoma, epithelioma variety, malignant.

Note.—In all growths about the oral cavity a small section should be made and sent to a pathologist for further examination microscopically and determine as to its malignancy. This case was too far gone for an operation, because of its malignancy and metastatic involvement, manifested by the glandular enlargement. Patient died six weeks later.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

The Dental Dysplasia of Capdepont. Fargin-Fayolle. Revue Belge de Stomatalogie, 1920, xviii, No. 1.

The first cases of this affection were described by Capdepont in 1905 and two years later the author saw his own first cases and confirmed the discovery. A third stomatologist, Schaefer, has also described cases and as far as known there have been no other reports published. The affection is a general dental dysplasia expressed clinically by a vulnerability and friability of the tissues not encountered in the same degree in any other dental affection. Histologically all three of the connective tissues of the teeth are involved, with predominance of the ivory. Pathogenetically the affection is a cytological lesion of the adamantoblasts and especially of the odontoblasts. It affects both dentitions and shows a familial incidence. The number, volume, implantation and direction of the teeth are all unfavorably influenced. The free portion of the teeth is worn away in varying degrees—perhaps only the cuspids are worn off, perhaps the entire crown down to the gums. The teeth have a barley-sugar color and appear slightly translucent. They are but slightly sensitive to heat and acids. All of the teeth are not uniformly affected, and some of them seem to have some relative immunity. The eruption of both dentures is delayed. The underlying process appears to be of the nature of an intoxication—the same process which underlies all dystrophies. The nature of this intoxication we can only surmise as akin to the autotoxicosis of pregnancy and closely related to normal metabolism. The morbid substance, whatever its nature, appears to have a specific or tropic action on the odontoblasts. The metabolic anomaly may be transmitted along two generations, for Capdepont saw it in three successive generations while on two occasions it attacked two brothers.

General Predisposing Causes of Caries. Patrone. La Odontologia, 1919 xxvii, Nos. 11-12.

The author through authorization by the National Council of Education of Argentina has examined the teeth of 2045 Buenos Aires school children. The age limits of the subjects were six to fourteen years. He found the enormous number of 1893 to be suffering with caries, or in other words only about 8 per cent

were free from that affection. For control purposes he then examined 1186 children in the city of Mar del Plata and encountered the surprising fact that only about one-half were subject to caries. But it is of interest to know that in 1910 a survey of the children of Mar del Plata showed but 32 per cent with caries, so that the latter appears to be on the increase. This town is small in comparison with the capital city, with low buildings and excellent outdoor ventilation. In the different incidence of caries in these two localities may lie the secret of the predisposing causes. A survey of the teeth of school children of Italy has shown the same disparity of caries in rural as in urban life. This was abundantly shown by Piperno during the late war in an examination of recruits. In other words caries is a disease of culture and of civilization. This is the more remarkable because the rural dweller does not care for his teeth, while in the city many do practice a hygiene of the teeth. The purity of the air is of course insufficient to explain the relative infrequency of caries in rural neighborhoods and the author is therefore thrown back to the vitamine theory and the belief that caries is a sort of deficiency disease. No hard and fast line can be drawn, for a defective diet is possible among the peasantry as well as the city slum dwellers.

Present State of the Treatment of Inoperable Cancer of the Tongue. Solomon. Zahnaerztliche Rundschau, 1920, xxix, No. 7.

The day has gone by when these unfortunate victims are cared for solely by morphine injections. Cancer of the tongue is especially common in Austria, or rather among Austrian men, for women are seldom attacked. Hence the lesion has always been brought into causal association with the masculine habits of smoking and drinking. But in certain other countries where these vices obtain women do not enjoy as much immunity, so that another factor must be thought of. In Austria the man over 70 begins to escape the toll of the disease while up to the age of 40 he is also relatively immune. "One time injury" was once accused but more recent studies have thrown doubt on this factor which at most acts as an auxiliary when the disease is already present. Chronic irritation is a more active factor and leucoplakia precedes about one lingual cancer in three. But leucoplakia may itself be the first stage of the disease. The chief resource in inoperable cancer of the tongue is radiation but as is too well known this not only falls short in a large number of cases but may in one way or another aggravate the lesion. The method of Keating-Hart or fulguration is specially recommended by its inventor for cancer of the tongue and Czerny has employed it with benefit in association with radium. Electrocoagulation has been tested with benefit by Nagelschmidt and several others. Thermopenetration or diathermia has been successfully combined with the x-ray by Pfahler and Muller, and the author himself has an excellent result attributable to electrocoagulation, he having used the technic of the late Doyen.

Case of Hutchinson's Teeth. Guilly. Revue de Stomatologie, 1920, xxii, No. 1.

The patient was a girl aged nineteen years, referred to the dental service of the Broca Hospital. Nothing could be learned of her parentage as she had been

abandoned at the age of two years. The stepmother states that she was well up to the age of nine, when a discharge from the left ear was present for several months. She continued in good health until fourteen, when visual disturbances began, and soon afterwards she went blind. The author found Hutchinson's teeth. The eye clinic reported bilateral atrophy of the optic nerve, peripheric retinochorioditis, nystagmus and divergent strabismus of the right eye. There was a positive Wassermann. Patient received injections of salvarsan until the reaction went negative, and afterward, thirty-three in all, with further injections of mercury cyanate and gray oil. The general condition was then excellent but no impression had been made on the blindness. The face and cavity of the mouth, aside from the teeth and possible shape of the palate showed nothing abnormal and the author was inclined to reject the first impression that the palate form was ogival. The upper denture was complete save the wisdom teeth. There was persistence on the left of the temporary canine, with displacement of the permanent tooth. Of all the upper teeth only the central incisors showed dysplasia and these agreed with the so-called Hutchinson's teeth. The lower jaw showed absence of wisdom teeth and persistence of two temporary molars; there was no dysplasia unless one could reckon a slight conical shape of the central incisors. The x-ray confirmed the ordinary diagnosis. It should be added that the two permanent premolars were absent. There was no trace of the tubercle of Carabelli. The loss of vision suggests an approaching tabes dorsalis but of this there is no other sign.

Teeth Which are Traversed or Furrowed by the Inferior Dental Nerve. Rodier. Revue de Stomatologie, 1920, xxii, Nos. 1-2.

The author contributes an elaborate study of this subject which resulted from the publication of two cases in 1909 of wisdom teeth traversed by the inferior dental nerve. The author who reported one of these cases has since borne the subject carefully in mind and up to 1914 had come upon a number of analogous cases. The outbreak of the war naturally delayed the publication of the paper. In all he has notes on 13 cases in which the teeth have been grooved by the nerve in question with four others in which a true passage was present. The explanation is probably a purely mechanical one. The immobility of the second molar is primarily responsible when the wisdom tooth is forced upwards and forwards and in extreme cases the oblique direction becomes horizontal and the tooth remains in inclusion. Immediately below the bulb of the wisdom tooth lies the inferior dental nerve and it is not difficult to understand why in the course of the development of this tooth and its calcification the nerve might be either completely enclosed in a dental canal or lie in a groove in the substance of the tooth. A collateral phenomenon of importance is the inclusion in the same paths of the proper blood vessels. Of much significance is the fact that the inclusion of these structures is not limited to the vestibular side of the tooth but is also seen on the lingual side. The phenomenon which has been described is not peculiar to the wisdom teeth and nerve furrows have been seen in the second and even the first molars. But complete canalization and most of the cases of furrowing have been seen in wisdom teeth. Two teeth may be groved, as in one of the cases involving

the first and second molars. Finally the author has seen a central incisor grooved by a blood vessel.

Definition of Dental Caries. Fargin-Fayolle. Revue de Stomatologie, 1920, xxii, No. 3.

Dental caries has been termed erroneously a dentinitis, as if limited to the dentine. The term is an unfortunate one, like pyorrhea alveolaris. Quotations from standard textbooks show that caries is termed a softening of the hard tissues of the teeth—dentine and enamel—and that this softening is of inflammatory nature. In reality caries is made up of several distinct conditions such as mechanical usury which may lead to cavity formation, dental erosion which may imitate true caries at times, the so-called dysplasia of Capdepont and other lacunar losses of substance which are distinct from true caries. When we come to the latter in the narrower or inflammatory sense this process is believed to affect essentially the hard tissues. The author would eliminate the necessity of an inflammatory or infectious component despite the practical importance of this feature, for the same kind of lesions may result in the total absence of these factors. Cavities, however formed, begin externally and extend into the substance of the tooth; but the principal distinction between ordinary or conventional caries and the mechanical, developmental and other forms is that in the former the cavities are really atypical both in character and in point of departure when compared with erosions, lacunar formations, mechanical usury and the dysplasia of Capdepont. In these forms both cavity shape and point of departure are typical.

The Maxillofacial Service at the A. R. C. M. H. No. 1, A. E. F., France. W. T. Coughlin, M.D., F.A.C.S. Medical Record, 1920, xcvii, No. 18.

The initials A. R. C. M. H. refer to the original American Ambulance No. 1, at Paris. This hospital was situated just outside the Maillot gate of the city and was improvised from a high school which at the time—1914— was in course of construction. The responsible head was the University of Pennsylvania and at the very outset a maxillofacial service was begun in charge of two American dentists who were in practice at Paris. Many exhibits of the excellence of the work done may be seen in the future in the Army Medical Museum at Washington. The department was finally closed in February, 1919. Soon after its inception the hospital was taken over by the American Red Cross and became known thenceforth as the American Red Cross Military Hospital No. 1. The author with three others forming the "oral and plastic unit began to function in April, 1918. The surgeon in charge of the maxillofacial service was Chas. A. Powers of Denver. The rush of work began in the following May. The ward for face and jaw cases contained 55 beds and at times overflow cases were cared for in the general surgical wards. But few patients were in danger of imminent death—about half a dozen died of suffocative phlegmon and sepsis. The first aid consisted in relieving pain and securing rough coaptation. Tracheotomy was never necessary. A ligature served to keep the tongue from dropping back. Shrinkage was prevented by hooks and elastic traction. In wounds involving the floor of the mouth no steps were taken to prevent fistula formation. Dakin's solu-

tion was found the best for irrigation at the outset and permanganate after the fifth day. Of six deaths exclusive of those mentioned above pneumonia caused four, secondary hemorrhage and meningitis the others. But few cases of fractured jaw required wiring the teeth, ordinary fixation measures proving sufficient as a rule. Drainage was not always instituted at the start but at times only after signs of infection. Fragments of bone and suspicious teeth were given a chance to heal in and even when quite loose were not removed until three weeks. The splint in common use was the "closed bite," the "open bite" apparatus being required only in certain bilateral fractures of the anterior portion of the lower jaw. In the former type a gutter capped the teeth of the entire jaw and patients were made to chew gum when the mouth was first opened. When the upper jaw was fractured the rhinologist was always called in. To this fact was due the total absence of empyema of the antrum. Dobell's solution was used in the nose cases in preference to Dakin's. Plastic work was undertaken just as soon as the wounds had healed. All bone, fat and epithelial transplantation was done under local anesthesia. No case of infection was lighted up by grafting. Between April, 1918, and February, 1919, something over 300 cases passed through the hospital.

Noma. Calvache. La Odontologia, 1919, xxvi, Nos. 11-12.

Several cases of noma are reported, as follows: A girl of nineteen suffered from a severe attack of enteritis which was followed by gangrene of the left cheek and commissure of the mouth. This case was of the so-called benign type, as there was no constitutional disturbance and the process was spontaneously arrested and healed up. The resulting deformity interfered with opening the mouth and was eventually relieved by a plastic operation. The second case occurred in a child of four years and ended fatally. Few details are given. Even less is said of the third case which also ended fatally despite the use of salvarsan. The fourth case is given in detail. The patient was a boy of five years with history of osteomyelitis of the lower jaw, ulcerative stomatitis, phlegmon of the mouth and noma. The state of affairs was attributed by the ignorant parents to a dentist who had extracted several teeth, but it was evident that the teeth were badly infected at the time. The first measures used were hydrogen peroxide, iodoform and solution of aluminium acetate. The patient did well, and on the fifteenth day a large bony sequestrum was brought away. Noma appeared as a sequela to the other lesions and was treated vigorously with the thermocautery and salvarsan and with ultimate success, although at one time the prognosis was very grave. A fistula was left in the cheek, one centimeter in diameter. A fifth case is given which followed an attack of measles. The outcome is unknown but the prognosis was grave at the last visit. The sixth case was much like the fourth, the patient having osteomyelitis of the lower jaw with ulceromembranous stomatitis before the noma appeared. The treatment was along the same lines and the condition appears to have been aborted. In the discussion which followed the delivery of the paper other cases were mentioned and it is evident that noma is a fairly common condition to the Spanish oral surgeons who identify it by the peculiar color of the parts before gangrene itself is in evidence—a waxy hue.

Relations of Otorhinolaryngology to Stomatology. Gradenigo. La Riforma Stomatologica, 1919, i, No. 1.

The distinguished otologist gives a very brief summary of the points of contact between these special disciplines. These points are numerous. Thus a sepsis in the buccal cavity may begin in carious teeth, in pyorrhea alveolaris, in the palatal tonsil, etc. A frequent association occurs between buccal sepsis on the one hand and recurrent tonsillitis and chronic adenoids on the other. Vincent's angina is a condition which affects alike the mucosa of the cheeks, the gums, throat, tonsil, etc. Another point of contact is seen in the connection between obstructed respiration and the shape of the dental arch. We find associated in a subject nasal obstruction from whatever cause, and a sort of dental ataxia. From one angle the nose in these cases is underdeveloped as a result of disuse. This subdevelopment is quickly manifested in a bad implantation of the teeth. In such cases the nasal obstruction is removed and the dental deformity corrected by wearing orthodontic prosthesis. In cleft and paralysed palate phonation and deglutition are notably interfered with: hence to secure orthophonia there should be coöperation between the rhinologist and stomatologist. Infection of the roots of the upper teeth is at times the cause of maxillary empyema. Dental empyema is the most common etiologic type in practice and is the most readily relieved, for the treatment consists in the extraction of the infected teeth. The relationship between buccal and aural troubles is less obvious. Carious teeth sometimes cause earache and a true otitis is simulated. Such a source of confusion is readily removed in practice.

Treatment of Dental Hemorrhage by Injection of Nolf's Propeptone. Fauconnier. Revue Trimestrielle Belge de Stomatologie, 1919, xvii, No. 1.

The author announces that alveolar hemorrhages which follow dental extraction may be both prevented and cured by subcutaneous or intramuscular injection of Nolf's propeptone. Nolf as is well known is one of the pioneers in the protein therapy of disease and recommended injection of peptone in hemophilia as far back as 1908. Human and horse serum have also long ago been tested in this respect. The solution in use is not a proprietary but may be made up by any one, 5 gm. of Witte's peptone and half a gram of sodium chloride being dissolved in 100 c.c. of water, the whole being sterilized by heat—120° C. for 15 minutes. Persistent and marked hemorrhage after extraction being looked upon as essentially hemophilic, a known bleeder will naturally receive a preventive injection. An injection may be made 24 hours before the proposed extraction or there may be 2 injections, one from 12 to 24 and the other 4 or 5 hours before extraction. If, however, hemophilia is recognized only after extraction, a curative injection of 10 c.c. of the solution is at once practiced, and if necessary repeated. Thus far anaphylaxis has not been seen in this connection. The injection is always made at a distance, and if intramuscular, in the buttocks. The rationale of the remedy is bound up in the property of propeptone to hasten the coagulation of the blood.

Error in X-Ray Diagnosis. Gilmour. The Dental Record, 1920, xl, No. 4.

The patient was a boy of fourteen years first seen about October, 1918. The consultation was hurried but nothing serious was perceived. In Christmas week, 1919, he was seen again with a discharge and fetid odor from between the upper right central and right lateral incisors, where a pocket of pus was found. Both teeth contained dead and fetid pulps and were drained, treated, and filled. The trouble was the result apparently of a direct trauma two years before which had required wiring. It was said by the dentist at the time that the teeth could not be saved. By the Easter following the filling, the teeth were still giving trouble and an x-ray was taken. The diagnosis was fracture of the right central incisor with some absorption following apicitis. The apex of the lateral incisor was suspicious. By the following August or September the author, feeling certain that the tooth was fractured and should come out, pulled it and was much chagrined to learn that the tooth was sound throughout. The only course was to reimplant it which was done and an x-ray at once taken to determine the success. The plate showed the same deceptive appearance of a fracture as before. After the tooth seemed to have healed in, the wire cradle was removed and the implanted tooth was soldered to the other central incisor. It should last at least 3 or 4 years after which a denture can be substituted if necessary. The oblique line across the tooth as seen in the plate which simulated a fracture was probably the thickened margin of the alveolus after partial absorption had occurred.

Late Accidents of Local Anesthesia. Fichot. Revue de Stomatologie, xxii, No. 3.

The type of case referred to is as follows: Two or three hours after intervention there is felt an indefinable anguish, a sense of shock followed by a chill of violent character. Dyspnea and nausea are added and usually headache and at times vomiting. The syndrome is the same as that sometimes seen at an earlier period and during intervention, but is not so pronounced and is in fact a delayed appearance of an accident of operation. The patient is found to have a moderate degree of fever and this subsides after six or eight hours. The pulse is usually accelerated in proportion, but exceptionally cases of bradycardia have been seen. The blood pressure apparatus of Pachon shows a characteristic lowering of tension. This was seen both in normal and hypertensive subjects. In a subject whose normal oscillation was 170 to 90 the pressure went down to 115-70. The viscosity of the blood was slightly increased. The corneal reflex persisted and the oculocardiac reflex was either abolished or notably diminished. Blood counts were not systematically studied but appear to agree with those seen in the accidents of early anesthesia. All goes to show that the syndrome represents an intoxication without any element of infection. Of 11 cases studied by the author not one had been exposed to the accidents of defective technic. The syndrome appears to agree in all respects with the so-called hemoclasic crisis of recent writers which has a basis in a disturbance of equilibrium of the colloids of the blood. This can be brought about by the injection of crystalloid as well as colloid substances, including some of the alkaloids. Other possible factors have to be kept in mind, as the natural action of

the drug and its tropism for certain nerve centers, the effect of possible capillary embolism, psychic components, etc., and of the personal equation of these anesthetic cases, which is marked.

Pyorrhea Alveolaris. Puterbaugh. Journal of the National Dental Association, 1920, vii, No. 4.

Irrespective of the specific cause the author attributes to serumal calculus deposited just under the free gingival fold the determining influence in the genesis of the affection. Without this factor the disease does not develop. The deposit is due to a perversion of the gingival secretion which in turn may be due to numerous factors. Considerable stress is laid on constitutional factors of which many may be accused. The belief of former days that chronic dyspeptics are very prone to pyorrhea still obtains but a vicious circle is doubtless present for pyorrhea seems able to set up a form in indigestion. In order to visualize the ability of constitutional factors to produce pyorrhea, it is necessary that the subject have a clean mouth free from caries or fillings. The supervention of pyorrhea in a clean young subject following a constitutional affection like tuberculosis brings out this relationship. Local factors which provoke the deposit of serumal calculus are also numerous. Salivary calculus produces recession of the gums without pocket formation. The principal local factors are the accumulation of food between the teeth and the presence of irritating crowns and bridges, while faulty contacts naturally play a role. Of early symptoms bleeding of the gums on pressure over the margin indicates that ulceration has begun. Subjective symptoms are discomforts such as the sensation of a foreign body wedged between the teeth. Marginal gingivitis is not necessarily pyorrhea, the latter not being in evidence until the pockets of pus have formed. The pyorrhea subject may be remarkably free from caries because of his alkaline salivary reaction which is associated with putrefaction, the latter causing the characteristic odor of pyorrhea. The latter should be differentiated from salivary calculus, ordinary swollen and bleeding gums, senile retraction of the gums, simple marginal gingivitis, etc.

Impacted Lower Third Molars. Nodine, A.M. New York Medical Journal, 1919, cx, 762.

The predisposing causes of impaction of lower third molars are: (1) defective embryonic development; (2) perverted development; (3) malnutrition; (4) syphilis; (5) rachitis; (6) neurotic tendency; (7) eruptive fevers; (8) anæmia; (9) artificial feeding; (10) scurvy; (11) cretinism; and (12) idiocy. The exciting causes are: (1) arrested maxillary development; (2) undue thickening and resistance of the overlying tissue; (3) undue stimulation of the inferior dental nerve by pathologic conditions producing nutritional changes that intensify the bone in the region of the impacted tooth; (4) malposition due to contracted dental arches; (5) severe traumatism to the jaws causing deposition of lime salts in the cancellous tissue; (6) too early loss or extraction of deciduous teeth producing abnormal density of the cancellous tissue of the mandible; (7) improper orthodontic treatment; (8) improper or excessive pressure in orthodontic cases; (9) inflammations of the jaw bones caused by decayed teeth; and (10) a

local increase in the density of the bone brought about by inflammation of the peridental membrane extending into the alveolar process.

The general effects of impacted teeth are functional, nervous, and mental disorders, paralysis of the arm, tonic spasm of the upper extremities, nervousness, insomnia, epilepsy, etc.

The Height of the Palate in Relation to Adenoids and Chronic Otitis. Editorial, Medical Herald, xxxix, No. 4, p. 94.

The large majority of medical men believe the adenoids cause the high V-shaped palate and its dire consequences.

Many discussions on this subject have taken place, and at an early date it was noticed that an abnormally high and narrow palate was accompanied by adenoid growths in the nasopharyngeal sac. Prof. Halmagren of Stockholm carried on investigations with the aim of discovering whether any connection could be discovered between the occurrence of chronic otitis and the existence of a high and narrow form of face.

Leptoprosopia is an expression of a general contour of the facial structure of certain individuals, being a relative extension in height, but more especially a narrower form of face. The general contour that in certain more extreme forms is very noticeable at first sight, is found in 43.5 per cent in the proportions of the face, nasal apertures, and the palate, and in 39.5 per cent either in the facial conditions as regards shape or that of the nasal apertures together with a high narrow palate. The high and narrow palate, hypsistaphlyia, is the thoroughly characteristic indication of the leptoprosopic type. To an extremely high degree adenoid growths occur in company with a high and narrow palate, while the palatal index of height and breadth in persons not suffering from any disease of the nose or ear, nor any glandular hyperplasias, on an average is 42.56; the index in cases with adenoid growths is 51.08. About 72 per cent of those having glandular hyperplasias in the nasopharynx showed one or other symptom of or predisposition to diseases of the ear.

Wright and Smith, in their work on "Diseases of the Nose and Throat," have the following: "Unquestionably the narrow high palatal arch and consequent narrow jaw and compressed nasal alae are associated more frequently with tonsils and adenoids than the primitive type of jaw. It is true one phenomenon is occasionally seen without the other, but the frequency of their association is so striking that coincidence without any relation of cause and effect is not a tenable argument. We are driven to conclude that in a general way the one is the sequence of the other. No mechanism has ever been demonstrated which has satisfied the reason or escaped the experimental demonstration of its inaccuracy in defending the thesis that the adenoids are the antecedent and the narrow alveolar arch is the consequence in the chain of causation. We believe that all the evidence points the other way. Children have adenoids because their parents transmit to them the inheritance of narrow jaws. The parents do not have the narrow jaws as an acquired trait, but as an evolutionary one. This we believe to be the chief hereditary factor in the etiology of the occurrence of adenoids and tonsils. We do not assert that it is the chief cause in the

etiology, but we confidently believe it accounts for the hereditary factor which can not be ignored."

It is, however, rather to environment than to heredity we must look for the most important factor in the etiology. It is to the frequent repetition of congestions of the mucosa of the pharynx that we trace both clinically and pathologically the genesis of lymphoid hypertrophy. Aside from repeated inflammations the lymphoid tissue receives the stimulus to proliferation from the direct impact of imperfectly filtered and moistened air and of secretions of the nasal chambers and their annexed cavities. The latter are as plainly a sequence of a narrow and distorted nasal passage as are the attacks of inflammation of the nasal and pharyngeal mucosa.

The Causative Relation Between Febrile States and Eruption of the Teeth. H. Abels. Deutsche Medizinische Wochenschrift, 1919, No. 14, p. 392.

The view to the effect that the eruption of the teeth is the cause of numerous diseased conditions is designated by the authors as misleading and dangerous, although it is supported by the contention of numerous physicians and by popular opinion. A connection between febrile affections and dentition does exist, but in the opposite sense, many febrile diseases lead to an increased eruption of teeth, in the same way as the increased growth of children during and after febrile disease, through the stimulating action of the toxins upon the epiphyses. It is also a well-known fact that mechanical or chemical stimulation of an epiphysis exerts a favoring influence upon the growth of the corresponding bone.

Gangrenous Inflammation of the Tooth Germ. H. Kassowitz. Deutsche Medizinische Wochenschrift, 1919, No. 14, p. 392.

An infant with gangrenous inflammation of the tooth germs was presented by the authors before a recent meeting of the Vienna Medical Society. The molar milk tooth, which had become visible, was removed with forceps, and a large amount of pus was evacuated. This disease was first described by Swoboda, and nine cases have so far been placed on record, all of which died except one. In the present instance, a cure was expected to result.

Etiology of Ulcerous Stomatitis. Bercher. Revue de Stomatologie, April, 1920, xxii, No. 4.

Many years ago Bergeron isolated this affection as a "specific, contagious and inoculable malady." This view was not universally accepted, however, until Vincent had demonstrated the constant presence of the fuso-spirillary symbiosis. But during the war it has been claimed of this affection that it is not contagious and not epidemic. From evidence accumulated in Roumania it is a general condition of alimentary origin. The epidemic sore mouths and sore throats seen on ship board are only pseudoepidemics. This is the view of the hygienists, but not of the stomatologists. The two views are not absolutely antagonistic, for the dietetic factor may simply serve as a predisposition to the operation of local and bacterial causes. Another factor long ago urged has been revived in the eruption of a tooth, whether a deciduous tooth in a child, or a permanent tooth

in later years, especially the wisdom tooth. From this angle ulcerative stomatitis begins with infection about the erupting tooth and involves the mouth from this single focus. The author having access to abundant material in the Val-de-Grace Hospital, has sought to bring about harmony among these somewhat conflicting views. It is easy to isolate a wisdom-tooth group which is classical. Cases occur, however, in which the evolution of the wisdom tooth is normal and here we may see a Vincent pharyngitis, the buccal cavity remaining intact. The connection here is obscure. Between these extremes there are transitions. Three cases are given of Vincent's angina with normal eruption of the wisdom teeth, or rather with elimination of the wisdom tooth factor—for an x-ray showed that no wisdom tooth was undergoing eruption at the time. We can only conclude that the fuso-spirillary symbiosis can attack the mouth under a variety of conditions due to widely different predisposing factors, of which eruption of the teeth is an important one.

Dental Forensic Cases. Hentze. Zahnarztliche Rundschau, May 11, 1920, xxix, No. 19.

The author who practices as a forensic physician states that it is not uncommon for the patient of a dentist to ask whether there are grounds for damage suits. He gives several cases in point one of which is as follows. The patient, a woman, was referred to him by a dentist to decide the question of possible malpractice by another dentist. The record of the case which was treated at the dental polyclinic appeared to incriminate the operator. The latter having diagnosticated an ulcerated tooth which demanded extraction made an injection of an obtunding solution which caused violent pain while the extraction itself was very painful. The pains had not subsided and had in fact increased with swelling of the cheek. The operator ordered chamomile poultices but the painful condition persisted for three weeks, at which period dead bone separated, leaving loosened teeth. The author was about to certify to the fact of malpractice when it was learned that before the present experience the patient had suffered in a similar manner at the hands of another dentist. Two months before visiting the accused she had had two teeth pulled under local anesthesia. The entire experience was similar, the injection having been painful and bone having finally come away. It was further learned that the woman had recently gone through an inunction cure for syphilis which had presumably caused mercurialism of the mouth with loosening of the teeth. The patient was now thoroughly examined. There was a fistulous opening in the lower jaw from which pus exuded, the probe showing dead bone. A strong oral fetor was present. After an x-ray had been taken the sequester was removed. The Wassermann was negative and there was no evidence that the patient had ever contracted syphilis nor was there evidence of past mercurialism. The condition was plainly an osteomyelitis of the lower jaw and while the dental manipulations had undoubtedly aggravated the condition and precipitated it, it became doubtful whether the dentist accused was accountable for failing to detect the presence of osteomyelitis.

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EDITORIALS

Radical Propaganda for the Extraction of Pulpless Teeth

A FEW years ago, certain members of the Research Commission of the National Dental Association, produced evidence which seemed to prove that infections at the roots of pulpless teeth might be carried through the blood stream and cause systemic disturbances, and a number of the medical and dental profession became more or less alarmed as to the future of such teeth. There seems to be very little doubt, as the result of experiment which has been carried on by Price, Hartzell and others, that systemic infection can be associated with pulpless teeth, and therefore some men reason that such teeth are a source of trouble, and consequently to avoid this trouble all pulpless teeth should be extracted. The evidence presented against the advisability of retaining pulpless teeth in the oral cavity seemed to be so overwhelming in the minds of some dentists that they at once began advocating the extraction of all teeth from which pulps had been removed. Some of them even went so far as to say that if it was

necessary to remove the pulp from a tooth; because of disease of that pulp, it would be better to extract the tooth in the beginning and not make any attempt to save it. Others contended that even if a tooth was saved by the filling of the roots according to standard methods of treatment, it would only be a short time until the tooth would give trouble and it would necessarily have to be extracted at a later age. All of the evidence that could be produced in favor of retaining pulpless teeth was immediately set aside, and the only evidence that was considered, was the "case reports" of a certain number of patients in whom it was supposed that systemic infection could be traced to pulpless teeth with infection at the ends of the roots.

While it is true that some patients with systemic infection have improved upon the removal of the pulpless teeth, it is also equally true that a large percentage of systemic infections do not improve when such teeth are removed. Cases have been reported where patients who have been suffering from a rheumatic tendency, arthritis, arteritis, endarteritis and endocarditis have improved upon the removal of pulpless teeth. Even when such an improvement occurs, it does not necessarily prove that the systemic infection has been caused by the infection at the ends of the pulpless teeth, for the fact is not proved that the infection of the teeth was the only infection present in the body. Very often when this improvement occurs, it is the result of the "change of balance" between the number of microorganisms in the system of the individual and the number of microorganisms which the leucocytes and the system can take care of.

Our friends, the "radical extractors of pulpless teeth," seem to forget that the individual possesses a great many other sources of infection besides the teeth. They also seem to forget that even though they have proved that germs are present at the end of the tooth root, they must also prove that germs are not present elsewhere. Improvement at the time of extraction or shortly after does not prove that the pulpless tooth was the source of the trouble, but only proves one of two other things. First, by the removal of the teeth some of the sources of infection in the body have been eliminated which changes the "balance" for a certain period of time. Second, by the removal of the teeth some of the blood vessels in the immediate area of infection have been opened and some of the germs which were present around the tooth have gained entrance into the blood stream and have produced a change therein similar to bacterial vaccine, and consequently have greatly increased the action of the leucocytes for a period of time. After the removal of a pulpless tooth it is very often observed that the individual has a rise of temperature, increased pulse which is generally caused by germs entering the blood stream and which acts upon the blood contents in a beneficial manner, and after the recovery of the first shock from the extraction of the tooth and the rise in temperature, the individual immediately improves.

This condition only proves the pulpless tooth has been one of probably many sources of infection in the body, and the removal of this tooth may be sufficient to produce a change in the systemic condition. However, in a large percentage of cases we find the ultimate result after the extraction of the pulpless tooth is not the permanent cure and does not produce the result which a great many of these "radical operators," unfortunately, have told their patients would occur.

It must be remembered that there may be an infection anywhere in the ali-

mentary tract, in the liver, the gall bladder, kidneys, fallopian tubes, prostate glands, or any other part of the anatomy. It must also be remembered that a great many more rheumatic conditions associated with systemic disturbances are the result of gonorrhea than are caused by pulpless teeth. The teeth are only one part of the anatomy of the individual, and they play a relative ratio to systemic infections that they play to the relative anatomical construction of the individual. For instance, we have about 30 feet of alimentary canal of which the oral cavity is only about one-sixtieth of that length, and therefore we might safely say that one-sixtieth of the systemic infection occurring in the individual, results from disturbances in the oral cavity. This does not even take into account other anatomic structures which also must be considered.

We must remember that we have the tonsils located in the pharynx which contain a large number of open crypts, and which in the majority of individuals became infected some time in life. It is our belief that in a great many instances where we find germs at the ends of pulpless teeth, the tonsils have been the primary source of infection and the teeth have been secondary. While we may succeed in locating the secondary infection from the tonsil crypts to the tooth, we must also remember that there probably are other sources of secondary infection besides the teeth, that are just as detrimental, probably more so, to the health of the individual than is the tooth.

Another thing which must be remembered is that when the so-called granuloma is found at the end of the tooth, even though germs are found in that granuloma, there is no positive evidence that the granuloma is the cause of the systemic infection in the individual. Postmortems of practically every adult show tuberculous infection in the lungs and from some of those tuberculous infections you can get tubercle bacilli, but it is an established fact that the individual did not die from tuberculosis, and ninety chances out of a hundred would not have succumbed to the disease because of the fact the germ was healed in by a protective limiting member which confined the infection. The granuloma which developed on the ends of teeth in the majority of cases is of such development and even though after the extraction of the tooth you open the granuloma and find a virulent germ which will produce all sorts of things when injected into an abdominal cavity of a rabbit, does not necessarily prove that this germ was detrimental to the individual, because Nature had built a fibrous membrane around it and would have eventually destroyed it.

Our radical friends will say that even if the germ is found in the granuloma the tooth should be extracted as a prophylactic measure, because the germ might become detrimental to the individual at a later period in life. According to this argument we might as well cut out every portion of the alimentary canal, in fact, we might advise a surgical removal of every organ of the body, because there are times in the life of every individual when it will be possible to grow germs from some part of practically every organ in the system. Anyone who has studied pathology and bacteriology and the process of infection knows that the system of the individual is subject to infection at all times in life, subject to the invasion of all kinds of microorganisms, but as a rule, these germs are eliminated and the individual lives a long and useful life after the invasion. However, if we would follow the teaching of the "radical extractors

of pulpless teeth" and apply the same treatment to all parts of the body which they insist on giving the teeth, in a very short time our organs would be so tampered with, suffer such radical surgical treatment, that there would be no one left for the radical operators to work on, because we would all be dead.

Until such times as the science of bacteriology has advanced to such a point that we can eliminate microorganisms from all parts of the body, I do not believe pulpless teeth are the great source of systemic infection, that has been claimed by radical operators whose principal and only means of livelihood is in the removal and extraction of teeth.

It has often been said that a little knowledge is a dangerous thing, and this is certainly true in regard to pulpless teeth. For instance, probably the one man who knows as much as anyone in regard to systemic infections from the teeth has been more often misquoted than any one. We refer to Dr. Thomas P. Hartzell, of Minneapolis. It is true Dr. Hartzell called the attention of the dental profession to systemic infections from pulpless teeth, but we have no knowledge of his ever having made the statement that all such teeth should be extracted and that all pulpless teeth were sources of systemic infection. The radical operators and extractors have taken a small portion of Hartzell's investigation and have built a false hypothesis around it, and are using a scientific investigation as a means of furthering their own interests. We mean the financial interest they receive from the extraction of teeth.

If these radical extractors were content simply to remove the tooth, it would not be so bad, but they have even gone further than that, and some are advocating the removal of the tooth and a large amount of the alveolar process which surrounds the tooth, with the idea of getting all the infection which may have invaded the cancellous portion of the alveolar process. The so-called "surgical removal of the tooth" whereby a large portion of the alveolar process is removed has never been indicated from a surgical standpoint, and is not recommended by men who have a knowledge of the histology and pathology and of the process of infection and repair. It seems to us that those who advocate the surgical removal of a tooth are doing so in the majority of cases to greatly impress the patient, thereby make the operation look more serious, and enable them to collect a fee proportional to the amount of "scare" they can "throw" into their patients. Probably from the financial standpoint and working upon the basis that every individual is trying to get as much out of his patient as he can, the operator might be justified from a selfish standpoint. However, not only do they succeed in "scaring" the patient and "extracting" a fee much greater in proportion to the service which they render, but they leave the patient in such a condition as to make it practically impossible for the dental profession to provide the patient with artificial substitutes that will render a serviceable function in the mastication of food. Taking the dental profession as a scientific organization, we believe that when they remove a natural tooth, they should leave the supporting and remaining tissue in such a shape that an artificial substitute can be placed, which will be of service and comfort to the patient. With the radical removal of the teeth and the alveolar process the remaining tissue in the mouth is left in such a condition that it is often impossible to make a proper and anatomic denture—one that will be serviceable —because so much structure has been removed that there is nothing to work on.

In viewing the radical propaganda for the extraction of pulpless teeth, we believe it is wrong. First, because only a small percentage of such teeth ever produced systemic infection. Second, because the radiograms show an area at the end of the roots does not prove that the tooth is the source of systemic disturbance to the individual. Third, because the systemic infection is present in the individual, and pulpless teeth are present in the mouth, which show that rarefied area does not prove that the pulpless tooth is the cause of the systemic infection, for, first, it may have nothing to do with it, and second, it may be developed as result of infection in some other part of the body. Fourth, because the extraction of the tooth seems to improve the systemic condition does not prove the pulpless tooth was the original cause, but may be only one of many focal infections which is contributing to the rheumatic condition, also that the removal of the tooth acted as a vaccine and produced an improvement in the systemic condition for a period of time, because a certain number of germs entered the blood stream upon the extraction of the tooth. Fifth, until such a time as all bacterial infection and invasion of the human system can be eliminated, we are opposed to contributing so much importance to the oral cavity as a source of infection, and eliminating all other sources of infection along the alimentary canal and other organs such as the gall bladder, liver, kidneys, fallopian tubes, prostate glands, etc. Sixth, the surgical removal of teeth by a cutting away of the alveolar process is the worst thing yet recommended, because the after results are such as can not be satisfactorily handled and the individual is no better from a surgical and pathologic standpoint, than he would have been with a more conservative removal of the tooth and proper treatment of the source of infection, provided there was any infection in the tooth. Seventh, because upon the removal of the tooth and granuloma, microorganisms are found within the connective tissue sac at the root of the tooth does not prove that that germ is the source of infection, because we have not established the fact that the germ was able to penetrate the limiting membrane. Eighth, those in favor of radical removal of pulpless teeth should make a greater study of histology and pathology, understand the conditions of repair and infection and remember that pulpless teeth are subject to the same rules of repair as are found in other parts of the body.

We do not claim that pulpless teeth are never a source of trouble, but we do believe many troubles are attributed to them which are caused by something else.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

American Dental Library and Museum Association

The next annual meeting of the American Dental Library and Museum Association will be held, August 23, 1920, 3:30 P.M., at the Forsyth Dental Infirmary, Boston, Mass.

At that session the official business will be taken up and a permanent constitution adopted.

All societies, colleges, etc., applying before that time will be included as charter members.

Another session will be held later in the week to suit the convenience of the majority of members, when an interesting program pertaining to library and museum matters will be given.

Dr. Wm. Bebb will present a short paper dealing with methods of building libraries and museums and of conducting same.

Dr. L. Pierce Anthony, Dental Cosmos: Advisability of Compiling a New Dental Bibliography, a Standard Reference List of Books on Dentistry Published Throughout the World. The last one compiled in this country was by C. G. Crowley in 1885.

Dr. B. W. Weinberger: Bibliography of Dental Periodicals Published in the United States and Great Britain.

All those interested are requested to be present.

A. F. Isham, Pres.
B. W. Weinberger, Sec'y, Treas.
40 East 41st Street, New York City.

European Orthodontia Society

Owing to untoward circumstances, and on account of the present difficulties of travel, the next meeting of the European Orthodontia Society, which was to take place in Amsterdam in July next, has been postponed to a more suitable time and place. Due notice will be given to all interested. For all information address Dr. James T. Quintero, Sec'y, 1, Quai Jules Courmont, Lyon, France.

Announcement

Doctor James T. Quintero announces that he has resumed the practice of Orthodontia at No. 1, Quai J. Courmont, in Lyon, France.